



*Canadian Agriculture.—Part II.*

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THE  
EASTERN PROVINCES.

BY

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## THE EASTERN PROVINCES.

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EASTERN Canada, comprising Ontario, Quebec, and the Maritime Provinces, is much better known in England than the great prairie region to the west, and it does not therefore appear necessary to enter, other than briefly, into the physical features of the older Provinces. The climate of Canada does not in different parts vary so much as might be anticipated when the great geographical range of the Dominion is considered. There appear, however, to be seven definable belts or zones of climate, each tolerably distinct in its temperature, rainfall, and general meteorological characters: (1) the extreme eastern, embracing Newfoundland and part of Quebec; (2) the Gulf area, including Prince Edward Island, Nova Scotia, and part of New Brunswick; (3) the St. Lawrence area, embracing the Province of Quebec; (4) the Lake region, including Ontario and Hudson Bay south; (5) the great inland or prairie region extending over Manitoba and the North-West Territories; (6) the Rocky Mountains; (7) the Pacific range.

The following remarks on climate refer chiefly to Eastern Canada:—\*

“Owing to the dry, clear, bracing atmosphere which generally prevails, the sense of discomfort produced by the raw easterly winds and damp fogs of an English spring suggests an idea of cold, such as is rarely thought of in a Canadian winter. There are, indeed, every winter a few days of intense cold, as in the summer there are brief periods of equally intense heat, when the thermometer ascends, or descends, through a scale unknown in the more equable English climate. But throughout the greater part of the winter season in Canada the sky is bright and clear, and the weather thoroughly enjoyable. Open sleighs are in use by all. Sleighing parties of pleasure are arranged for the period of full moon, that they may return home over the snow, after an evening's enjoyment at some appointed rendezvous; skating, snow-shoeing, and other out-door exercises are in universal favour; and the

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\* ‘Encyc. Brit.’ 9th edition, 1876. Art. “Canada.”



sound of the sleigh-bells in the open thoroughfares adds to the exhilarating sense produced by the pure bracing atmosphere. Snow accordingly brings with it no such ideas of discomfort as are associated with it in England, while by the farmer it is hailed as altogether beneficial. In the Province of Quebec the snow begins to lie early in November; in Ontario it is fully a month later; and it differs correspondingly at various localities throughout the Dominion. But everywhere the appearance of the snow is hailed as seasonable and beneficial. It protects the wheat sown in autumn from the frost, affords facilities to the farmer for bringing his produce to market, aids the lumberer in collecting the fruits of his labour in the forest at suitable points for transport by water with the spring freshets, and so contributes alike to business and pleasure.

"January and February are the coldest months of the year. Throughout the whole of Canada steady sleighing is reckoned upon during those months. In Quebec and Manitoba a longer period of sleighing can be relied upon. In Nova Scotia, New Brunswick, and Prince Edward Island, and also the Pacific coasts, the temperature is modified both in summer and winter according to vicinity to the sea. Abrupt changes of temperature occur both in summer and in winter. A period of great cold early in the month of January is so frequently followed by a complete change, that its periodicity is reckoned upon under the name of the January thaw. Snow finally disappears in Quebec about the middle of April. In Ontario it is generally gone a month earlier.

"Ploughing usually commences in Ontario about the middle of April, and in favourable seasons is prolonged into the month of December. But throughout the Dominion, stretching as it does across the continent, and embracing an area nearly equal in size to Europe, the period varies with the locality, and is affected by the vicinity of the great lakes or other local influences. Cattle are turned out to graze in April, feeding in part upon the tender shoots of the spring forest growth, until the appearance of the young pasture with the disappearance of the snow. Before the end of July harvest begins; and with the rapidity of growth under the warm Canadian skies, the hay, grain, and root-crops follow in swift succession; the cleared land is brought again under the plough, and the autumn sowing of wheat is carried on till another abrupt change brings the season to a close. In this way the Canadian climate is marked by the striking contrast of two seasons—summer and winter,—bringing with them alternations of fruitful labour and of repose, intermingled with profitable industry and pleasure. This characteristic prevails with slight variations throughout the greater part of the Dominion. . . . Winter begins with crisp clear weather, which grows increasingly cold and cloudy. The wind wheels to the north-east, and with it comes the snow, and the long steady winter of the Canadian year."

The general character of the climate in Eastern Canada may be still further indicated by the following tables, containing a summary of the weather statistics for the year 1882 at four stations, in as many separate provinces. These tables are made up from the 'Report of the Meteorological Service of the Dominion of Canada for the year ending December 31, 1882,' which was published last year.

It is to be regretted that, although this is the twelfth annual report, it contains no summary of the results of the eleven preceding years' observations, which would undoubtedly have enhanced the value of the publication, besides affording useful

# GENERAL METEOROLOGICAL REGISTER, TORONTO, ONTARIO, 1882, with Summaries for the Six preceding Years.

|   | Jan.  | Feb.  | Mar.  | Apr.  | May.  | June. | July. | Aug.  | Sept. | Oct.  | Nov.  | Dec.  | 1882.  | 1881. | 1880. | 1879. | 1878. | 1877. | 1876. |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|
| Mean Height of Barometer reduced to sea-level (Inches) .. | 30.11 | 30.08 | 30.08 | 30.03 | 30.02 | 29.87 | 29.98 | 30.00 | 30.09 | 30.08 | 30.16 | 30.06 | 30.05  | 30.03 | 30.03 | 30.03 | 29.96 | 30.03 | 30.00 |
| Mean Temperature of Air (Fahr.) ..                        | 23.17 | 30.33 | 31.70 | 39.97 | 48.92 | 61.62 | 66.83 | 67.39 | 61.25 | 51.83 | 35.89 | 26.10 | 45.42  | 46.06 | 45.43 | 44.16 | 47.09 | 46.10 | 43.98 |
| Highest Temperature                                       | 40.1  | 50.3  | 56.2  | 65.0  | 70.9  | 85.4  | 89.9  | 86.9  | 88.3  | 74.3  | 64.2  | 40.1  | 89.9   | 92.7  | 89.9  | 89.5  | 95.4  | 88.7  | 92.9  |
| Lowest Temperature  | -17.4 | 9.6   | 14.4  | 21.9  | 30.0  | 37.0  | 51.3  | 46.8  | 43.1  | 28.0  | 7.2   | 4.1   | -17.4  | -15.1 | -8.3  | -8.9  | -9.0  | -13.9 | -9.5  |
| Greatest Daily Range                                      | 36.0  | 25.9  | 21.1  | 32.9  | 27.3  | 29.9  | 30.6  | 27.5  | 25.2  | 26.0  | 18.3  | 28.2  | 36.0   | 40.9  | 30.8  | 34.1  | 28.6  | 33.2  | 42.1  |
| Rainfall in Inches ..                                     | 1.23  | 1.18  | 1.55  | 1.01  | 3.58  | 2.63  | 1.67  | 2.52  | 2.09  | 1.15  | 1.39  | 1.21  | 20.59  | 21.14 | 30.92 | 22.52 | 43.39 | 21.89 | 21.46 |
| Number of Days' Rain                                      | 6     | 7     | 10    | 7     | 11    | 12    | 11    | 14    | 8     | 8     | 9     | 7     | 110    | 123   | 140   | 107   | 132   | 116   | 117   |
| Snowfall in Inches ..                                     | 7.8   | 5.4   | 5.7   | 0.2   | ..    | ..    | ..    | ..    | ..    | ..    | 7.6   | 15.8  | 42.5   | 57.6  | 44.0  | 68.5  | 51.0  | 37.3  | 113.4 |
| Number of Days' Snow                                      | 13    | 8     | 11    | 3     | ..    | ..    | ..    | ..    | ..    | ..    | ..    | 18    | 53     | 64    | 78    | 79    | 56    | 54    | 76    |
| Number of Fair Days                                       | 16    | 14    | 15    | 20    | 20    | 18    | 20    | 17    | 22    | 23    | 13    | 11    | 209    | 191   | 163   | 188   | 202   | 204   | 186   |
| Number of Thunder-storms ..                               | ..    | ..    | 1     | 2     | ..    | 4     | 5     | 7     | 5     | 3     | 1     | ..    | 28     | 24    | 47    | 37    | 30    | 33    | 19    |
| Number of Hours' Sunshine ..                              | 103.6 | 115.4 | 148.9 | 203.8 | 234.4 | 276.7 | 289.3 | 234.8 | 245.2 | 211.5 | 78.1  | 27.8  | 2169.5 | ..    | ..    | ..    | ..    | ..    | ..    |
| Ratio to possible Sunshine ..                             | 0.36  | 0.39  | 0.40  | 0.50  | 0.51  | 0.59  | 0.61  | 0.51  | 0.65  | 0.62  | 0.28  | 0.10  | 0.46   | ..    | ..    | ..    | ..    | ..    | ..    |

GENERAL METEOROLOGICAL REGISTER, MONTREAL, PROVINCE OF QUEBEC, 1882.

|  | Jan.  | Feb.  | March. | April. | May.  | June. | July. | August. | Sept. | Oct.  | Nov.  | Dec.  | Entire Year. |
|--|-------|-------|--------|--------|-------|-------|-------|---------|-------|-------|-------|-------|--------------|
| Mean Height of Barometer reduced to Sea Level (Inches) .. .. . | 30.11 | 30.09 | 30.05  | 29.97  | 29.99 | 29.80 | 29.90 | 29.96   | 30.06 | 30.06 | 30.11 | 30.03 | 30.01        |
| Mean Temperature of Air (Fahr.) .. .. .                        | 12.20 | 21.04 | 25.05  | 35.59  | 49.68 | 62.72 | 67.64 | 68.34   | 58.21 | 49.43 | 31.36 | 17.67 | 41.58        |
| Highest Temperature .. .. .                                    | 42.4  | 46.2  | 47.0   | 57.2   | 67.5  | 86.7  | 84.9  | 91.0    | 79.1  | 74.7  | 60.6  | 57.1  | 91.0         |
| Lowest Temperature .. .. .                                     | -26.0 | -8.5  | 1.4    | 13.1   | 27.1  | 43.9  | 50.8  | 48.0    | 40.6  | 30.5  | 14.3  | -5.3  | -26.0        |
| Greatest Daily Range .. .. .                                   | 36.1  | 33.0  | 28.8   | 23.5   | 30.0  | 27.5  | 22.0  | 25.0    | 21.5  | 24.1  | 24.8  | 30.2  | 36.1         |
| Rainfall in Inches .. .. .                                     | 1.18  | 0.58  | 2.46   | 1.58   | 1.50  | 4.74  | 6.04  | 2.52    | 3.63  | 1.34  | 1.39  | 0.04  | 27.00        |
| Number of Days' Rain .. .. .                                   | 4     | 4     | 8      | 11     | 15    | 20    | 17    | 11      | 12    | 14    | 14    | 3     | 133          |
| Snowfall (in Inches) .. .. .                                   | 28.2  | 23.2  | 15.3   | 3.2    | 0.5   | ..    | ..    | ..      | ..    | ..    | 1.0   | 39.8  | 111.2        |
| Number of Days' Snow .. .. .                                   | 20    | 13    | 15     | 5      | 1     | ..    | ..    | ..      | ..    | ..    | 5     | 24    | 83           |
| Number of Fogs .. .. .   | 3     | 1     | 3      | ..     | ..    | ..    | ..    | ..      | 2     | 4     | 6     | 1     | 20           |
| Number of Thunderstorms .. .. .                                | ..    | ..    | ..     | 1      | ..    | 4     | 7     | 3       | 4     | 1     | 1     | ..    | 21           |

## GENERAL METEOROLOGICAL REGISTER, ST. JOHN, NEW BRUNSWICK, 1882.

|  | Jan.  | Feb.  | March. | April. | May.  | June. | July. | August. | Sept. | Oct.  | Nov.  | Dec.  | Entire Year. |
|--|-------|-------|--------|--------|-------|-------|-------|---------|-------|-------|-------|-------|--------------|
| Mean Height of Barometer reduced to Sea Level (Inches) .. .. . | 29.96 | 30.04 | 29.98  | 29.91  | 29.97 | 29.80 | 29.95 | 29.97   | 30.01 | 30.05 | 30.03 | 29.95 | 29.97        |
| Mean Temperature of Air (Fahr.) .. .. .                        | 18.18 | 21.03 | 27.53  | 32.96  | 44.10 | 55.72 | 59.04 | 59.36   | 55.31 | 47.80 | 33.87 | 23.36 | 39.78        |
| Highest Temperature .. .. .                                    | 41.0  | 41.0  | 45.0   | 49.0   | 60.0  | 79.0  | 74.0  | 82.0    | 74.0  | 63.0  | 62.0  | 48.0  | 82.0         |
| Lowest Temperature .. .. .                                     | -11.0 | -6.0  | -8.0   | 6.0    | 27.0  | 41.0  | 44.0  | 44.0    | 37.0  | 31.0  | 18.0  | 5.0   | -11.0        |
| Greatest Daily Range .. .. .                                   | 36.0  | 28.0  | 40.0   | 21.0   | 26.0  | 27.0  | 24.0  | 27.0    | 23.0  | 20.0  | 17.0  | 37.0  | 40.0         |
| Rainfall in Inches .. .. .                                     | 1.02  | 2.47  | 3.83   | 1.54   | 3.14  | 6.66  | 4.64  | 1.89    | 4.59  | 3.34  | 1.19  | 1.39  | 35.70        |
| Number of Days' Rain .. .. .                                   | 5     | 3     | 6      | 6      | 11    | 13    | 14    | 4       | 14    | 12    | 5     | 3     | 96           |
| Snowfall in Inches .. .. .                                     | 35.0  | 50.0  | 23.2   | 24.6   | 2.5   | ..    | ..    | ..      | ..    | ..    | 11.0  | 12.4  | 158.7        |
| Number of Days' Snow .. .. .                                   | 16    | 10    | 10     | 10     | 1     | ..    | ..    | ..      | ..    | ..    | 7     | 12    | 66           |
| Number of Fogs .. .. .   | ..    | ..    | ..     | 4      | 3     | 6     | 9     | 9       | 9     | 10    | 1     | 1     | 52           |
| Number of Thunderstorms .. .. .                                | ..    | ..    | ..     | ..     | ..    | 3     | 2     | 2       | 1     | ..    | ..    | ..    | 8            |

## GENERAL METEOROLOGICAL REGISTER, HALIFAX, NOVA SCOTIA, 1882.

|  | Jan.  | Feb.  | March. | April. | May.  | June. | July. | August. | Sept. | Oct.  | Nov.  | Dec.  | Entire Year. |
|--|-------|-------|--------|--------|-------|-------|-------|---------|-------|-------|-------|-------|--------------|
| Mean Height of Barometer reduced to Sea Level (Inches) .. .. . | 29.97 | 29.97 | 29.99  | 29.92  | 29.99 | 29.84 | 29.98 | 29.99   | 30.06 | 30.06 | 30.01 | 29.93 | 29.99        |
| Mean Temperature of Air (Fahr.) .. .. .                        | 21.59 | 22.65 | 28.08  | 33.30  | 44.26 | 56.97 | 64.13 | 64.45   | 58.42 | 49.72 | 36.87 | 27.20 | 42.30        |
| Highest Temperature .. .. .                                    | 47.6  | 42.9  | 44.3   | 55.8   | 69.4  | 78.6  | 86.7  | 90.2    | 80.3  | 70.8  | 63.8  | 50.0  | 90.2         |
| Lowest Temperature .. .. .                                     | -8.0  | -2.9  | 9.0    | 13.2   | 28.1  | 33.0  | 47.6  | 44.6    | 40.4  | 30.0  | 25.8  | 11.0  | -8.0         |
| Greatest Daily Range .. .. .                                   | 32.1  | 34.3  | 24.0   | 27.0   | 29.9  | 32.9  | 28.7  | 35.7    | 27.3  | 22.3  | 23.1  | 31.0  | 34.3         |
| Rainfall in Inches .. .. .                                     | 3.16  | 1.67  | 5.46   | 3.68   | 4.66  | 5.51  | 5.18  | 3.93    | 5.92  | 7.52  | 0.81  | 1.31  | 48.81        |
| Number of Days' Rain .. .. .                                   | 9     | 5     | 9      | 8      | 14    | 17    | 15    | 11      | 17    | 13    | 8     | 7     | 133          |
| Snowfall in Inches .. .. .                                     | 36.8  | 42.3  | 15.9   | 11.2   | ..    | ..    | ..    | ..      | ..    | ..    | 5.6   | 21.4  | 133.7        |
| Number of Days' Snow .. .. .                                   | 13    | 15    | 13     | 11     | ..    | ..    | ..    | ..      | ..    | ..    | 7     | 15    | 74           |
| Number of Fogs .. .. .   | 2     | 1     | 5      | 3      | 10    | 13    | 8     | 6       | 7     | 3     | 1     | 0     | 59           |
| Number of Thunderstorms .. .. .                                | ..    | ..    | ..     | ..     | ..    | 3     | 1     | 1       | 2     | ..    | ..    | ..    | 7            |

figures both for comparison and for the foundation of general statements.

The flora of Eastern Canada, and indeed of the Atlantic borders of North America generally, presents a similarity to that of the other side of the ocean which cannot fail to attract notice, but, in receding westward or southward, the similarities are found to be overshadowed by the differences. As bearing on this interesting subject, I take the following remarks from Professor Asa Gray's paper on the 'Characteristics of the North American Flora':—

"In the fields and along open roadsides the likeness (to the flora of Western Europe) seems to be greater. But much of this likeness is the unconscious work of man, rather than of nature, the reason of which is not far to seek. This was a region of forest, upon which the aborigines, although they here and there opened patches of land for cultivation, had made no permanent encroachment. Not very much of the herbaceous or other low undergrowth of this forest could bear exposure to the fervid summer's sun; and the change was too abrupt for adaptive modification. The plains and prairies of the great Mississippi Valley were then too remote for their vegetation to compete for the vacancy which was made here when forest was changed to grain-fields and then to meadow and pasture. And so the vacancy came to be filled in a notable measure by agrestial plants from Europe, the seeds of which came in seed-grain, in the coats and fleece and in the imported fodder of cattle and sheep, and in the various but not always apparent ways in which agricultural and commercial people unwittingly convey the plants and animals of one country to another. So, while an agricultural people displaced the aborigines which the forest sheltered and nourished, the herbs, purposely or accidentally brought with them, took possession of the clearings, and prevailed more or less over the native and rightful heirs to the soil,—not enough to supplant them, indeed, but enough to impart a certain adventitious Old World aspect to the fields and other open grounds, as well as to the precincts of habitations. In spring-time you would have seen the fields of this district (Montreal) yellow with European Buttercups and Dandelions, then whitened with the Ox-eye Daisy, and at midsummer brightened by the cerulean blue of Chicory. I can hardly name any native herbs which *in the fields and at the season* can vie with these intruders in floral show. The common Barberry of the Old World is an early denizen of New England. The tall Mullein, of a wholly alien race, shoots up in every pasture and new clearing, accompanied by the common Thistle, while another imported Thistle, called in the States 'the Canada Thistle,' has become a veritable nuisance, at which much legislation has been levelled in vain. . . .

"Opportunity may count for more than exceptional vigour; and the cases in which foreign plants have shown such superiority are mainly those in which a forest-destroying people have brought upon newly-bared soil the seeds of an open-ground vegetation. . . .

"That it is opportunity rather than specially acquired vigour that has given Old World weeds an advantage may be inferred from the behaviour of our weeds indigenous to the country, the plants of the unwooded districts—prairies or savannas west and south—which, now that the way is open, are coming in one by one into these eastern parts, extending their area continually, and holding their ground quite as pertinaciously as the immigrant denizens. Almost every year gives new examples of the immigration of campestrine western plants into the Eastern States. They are well up to the spirit of the age: they travel by railway. The seeds are transported, some in the coats of



cattle and sheep on the way to market, others in the food which supports them on the journey, and many in a way which you might not suspect, until you consider that these great roads run east and west, that the prevalent winds are from the west, that a freight-train left unguarded was not long ago blown on for more than one hundred miles before it could be stopped, not altogether on down grades, and that the bared and mostly unkempt borders of these railways form capital seed-beds and nursery-grounds for such plants."

**As regards the composition of the arboreal vegetation of British North America, the same high authority adds:—**

"The *Coniferae* native to the British Islands are one Pine, one Juniper, and a Yew; those of Canada proper are four or five Pines, four Firs, a Larch, an *Arbor-Vita*, three Junipers, and a Yew; fourteen or fifteen to three. Of *Amentaceous* trees and shrubs, Great Britain counts one Oak (in two marked forms), a Beech, a Hazel, a Hornbeam, two Birches, an Alder, a *Myrica*, eighteen Willows, and two Poplars—twenty-eight species in nine genera, and under four natural orders. In Canada there are at least eight Oaks, a Chestnut, a Beech, two Hazels, two Hornbeams of distinct genera, six Birches, two Alders, about fourteen Willows and five Poplars, also a Plane tree, two Walnuts, and four Hickories; say forty-eight species, in thirteen genera, and belonging to seven natural orders. The comparison may not be altogether fair; for the British flora is exceptionally poor, even for islands so situated. But if we extend it to Scandinavia, so as to have a continental and an equivalent area, the native *Coniferae* would be augmented only by one Fir, the *Amentaceae* by several more Willows, a Poplar, and one or two Birches; no additional orders nor genera."

The extent of land under cultivation in Canada is at present about 22,000,000 acres, besides about 7,000,000 acres under improved pasture. The average size of Canadian farms is, according to Professor Brown, of Guelph, a little under 150 acres. The average annual gross value of produce is 4*l.* 12*s.* per acre over all the Provinces, the extremes being 8*l.* 12*s.* and 3*l.* Clear profit, after paying for labour, maintenance, interest on capital, and other charges, may be put at an average of over 12*s.* per acre. The average farm carries live-stock to the value of 1*l.* 12*s.* per acre. The annual taxes upon land consist of a township rate, a school rate, and a county rate, amounting in all to an average of 5*d.* per acre. Land is being actually occupied at the rate of 380,000 acres per annum, and reclaimed at the rate of 100,000 per annum. Within recent years wheat-production has increased at the rate of 70,000 acres per annum. The population is still essentially an agricultural one, for there are not many large aggregations of non-farming classes in any part of the Dominion. The annual value of produce per acre is very considerably less than from the older cultivated lands in England, and the annual expenditure per acre, including labour and fertilisers, is remarkably low.

The general characters of Canadian farming are somewhat distinct in the different Provinces. Ontario agriculture is of quite a British type in cropping and stock farming, but with

a larger proportion of grain and less pasture, and with fewer cattle and sheep per acre. In Quebec, the mode of farming is suggestive of a large market-gardening system, with live-stock suited to French requirements. And in the Maritime Provinces, where barley, oats, and potatoes constitute the staple crops, there exists, or did exist till recently, a somewhat general indifference to improved live-stock.

As the Provinces of Eastern Canada are well defined, and as their collective area is very large, it seems desirable to enter somewhat into detail concerning the agricultural features of each. Before doing so, however, and as it may save a considerable amount of repetition later on, it may be well to give some account, first, of the cattle trade, and, secondly, of the dairy industry of Canada.

#### THE CANADIAN CATTLE TRADE.

The cattle trade of Canada is increasing with very great rapidity. It has passed out of the tentative stage and has grown into an enormous business, in which hundreds of thousands of dollars have been invested by shrewd practical men. It embraces, on the one hand, the importation of pure-bred animals with the object of improving Canadian stock; and, on the other, the exportation of cattle and sheep to supply the English meat-market. The number of the former is, as might be expected, very insignificant as compared with that of the latter. And yet it was so recently as the year 1874 that the exportation of Canadian cattle across the Atlantic was commenced, the shipment that year numbering 455 head, since when the quality of the stock has undergone material improvement, and the prices realised have fully met the expectations of the dealers interested in the traffic. To Mr. John Dyke, the Canadian Government Agent at Liverpool, belongs the credit of having initiated this trade. The following figures show the official returns of cattle and sheep exported to Europe during the last eight years from Canadian ports:—

| Year. | Cattle. | Sheep.  |
|-------|---------|---------|
| 1877  | 6,940   | 9,504   |
| 1878  | 18,655  | 41,225  |
| 1879  | 25,009  | 80,332  |
| 1880  | 50,905  | 318,143 |
| 1881  | 45,535  | 62,401  |
| 1882  | 35,738  | 75,905  |
| 1883  | 55,625  | 114,352 |
| 1884  | 61,843  | 67,197  |



The total annual value of the cattle shipped from Canada seven or eight years ago was less than 80,000*l*. The value of the imports of live-stock from Canada into the United Kingdom during the last two years, is returned by the Board of Trade as follows:—

|                   | 1883.      | 1884.      |
|-------------------|------------|------------|
|                   | £          | £          |
| Oxen and Bulls .. | 1,115,470  | 1,260,465  |
| Cows .. ..        | 24,159     | 40,351     |
| Calves .. ..      | 137        | 122        |
| Sheep and Lambs.. | 215,742    | 125,841    |
| Swine .. ..       | 6          | 149        |
|                   | £1,355,514 | £1,426,928 |

Although I was in Montreal only for a week in August, I noticed nearly every day large droves of cattle on their way to the wharves on the banks of the St. Lawrence for shipment in the Atlantic steamers, and it is hardly possible in the summer to cross from Liverpool to Quebec without sighting one or more steamers laden with cattle for Glasgow or Liverpool. The following statement presents another view of the export trade in Canadian cattle, as it specifies the port of shipment, and shows the number and value of horned cattle shipped at the several ports mentioned:—

| YEAR. | Montreal. |            | Quebec. |          | Halifax. |         |
|-------|-----------|------------|---------|----------|----------|---------|
|       | No.       | Value.     | No.     | Value.   | No.      | Value.  |
|       |           | £          |         | £        |          | £       |
| 1879  | 17,616    | 280,560    | 2,716   | 28,425   | 22       | 252     |
| 1880  | 27,474    | 401,633    | 4,313   | 35,377   | 913      | 15,913  |
| 1881  | 33,665    | 456,296    | 11,761  | 107,205  | 2,408    | 47,925  |
| 1882  | 30,243    | 397,663    | 7,385   | 71,630   | 3,296    | 64,318  |
| 1883  | 33,946    | 580,626    | 1,593   | 26,755   | 1,064    | 20,493  |
| 1884  | 57,552    | 1,438,800  | 680     | 17,000   | 3,611    | 90,275  |
| Total | 200,496   | £3,555,578 | 28,448  | £286,392 | 11,314   | 239,176 |

Whence is derived the following summary (p. 13) of the number and value of the horned stock shipped from the ports specified during the six years 1879 to 1884.

*Live-Stock Quarantine.*—The privilege that Canada enjoys in the immunity of her live-stock from disease is one that she does well to guard with the utmost jealousy, and all cattle entering

|                  | No.     | Value.     |
|------------------|---------|------------|
|                  |         | £          |
| Montreal .. .. . | 200,496 | 3,555,578  |
| Quebec .. .. .   | 28,448  | 286,392    |
| Halifax .. .. .  | 11,314  | 239,176    |
| Total .. .. .    | 240,258 | £4,081,146 |

the Dominion are subjected to a rigid quarantine. I have already given some account of the regulations respecting the admission of cattle from the Western States of the Union into Manitoba and the North-West, and this seems an appropriate place in which to sketch briefly the history of the live-stock quarantine in Eastern Canada. The terrible outbreak of foot-and-mouth disease and of pleuro-pneumonia in England, in the year 1875, led the Canadian Parliament to pass an Act prohibiting the importation of cattle from the mother country. Notwithstanding this prohibition, Mr. Whitfield, a wealthy West India merchant, possessing an extensive stock farm at Rougemont, Province of Quebec, tried to import some thirty thoroughbred cattle from Liverpool, hoping his plea of improving Canadian live-stock would lead to an exception being made in his favour. But the Department of Agriculture remained firm, and Mr. Whitfield had to remove his cattle to Newfoundland, whence they were re-shipped to England and sold at an enormous loss. It is pleasant to be able to record, however, that Mr. Whitfield has now upon his Rougemont estate, which he has recently placed at the temporary disposal of the Provincial Government as a model farm, upwards of 100,000*l.* worth of carefully selected and imported pedigree live-stock.

The case just mentioned was brought under the notice of the authorities at Ottawa by Dr. McEachran, of Montreal, who represented that it was a serious drawback to the cattle raisers and breeders of Canada to be prohibited from importing live-stock from across the Atlantic. The result was the establishment, in 1876, of the first live-stock quarantine station in Canada. An admirable site was chosen in the interior of the Government fort at Point Levis, on the south shore of the St. Lawrence, opposite Quebec. The accommodation, small at first, has been extended, till now some fifty acres of land inside and outside the fortifications are occupied by the station; there are eighteen sheds, and as many as 700 head of cattle can be accommodated at one time. For the first three years the quarantine was limited to the insufficient period of eight days, but

this was changed in 1879 to ninety days, at which period it has since stood. Dr. McEachran, of Montreal, is Dominion Inspector of quarantine, and Dr. Couture, of Quebec, is the local assistant, and the object of the quarantine is to prevent the introduction into Canada of all or any of the following diseases: rinderpest, contagious pleuro-pneumonia, and foot-and-mouth disease, in the case of cattle; foot-and-mouth disease, foot-rot, and scab, in the case of sheep; and hog-cholera in the case of swine.

The Government possess sufficient land to enlarge the quarantine station to 150 acres, if necessary. The sheds are so arranged that each one is surrounded by from two to three acres of land. Cattle arriving by one vessel are kept quite isolated from those arriving by another, a space of 10 feet to 14 feet being fenced off between the grounds occupied by the different shipments. The sheds are of various sizes, and contain single rows of stalls, each stall being 8 feet wide, and allowing 4 feet for each of its occupants. The sheds are 16 feet wide, 16 feet high in front, and 8 feet behind, and are well ventilated both in summer and in winter. Scrupulous cleanliness is observed both in the yards and in the sheds. Importers pay no charge for quarantine, but they provide food, attendance, and litter, either straw or sawdust. The buildings and fences have hitherto cost from 4000*l.* to 5000*l.* The fences are all movable. The annual cost of maintenance of the station is about 1600*l.*

It is obvious that the Government of Canada are determined to spare no effort or expense to keep the cattle of the Dominion pure and healthy, and free from all contagious disease, and the steps which have been resorted to for this purpose cannot but command the sympathetic admiration of English farmers. The Canadian argument on the subject is simple enough: "If we let disease find its way into the Dominion, the cattle we export will be liable to carry it with them, and our country will be scheduled by the authorities in England." Much of the efficiency of the present system of quarantine is due to the energy of the Dominion Minister of Agriculture, the Hon. John Henry Pope, who very soon after he entered office sent an official into the New England States to inquire into the truth of rumours as to the diseased condition of many American animals. These rumours were verified, whereupon American cattle were prohibited from entering Canada, and Mr. Pope, having informed the British Government of this fact, and demonstrated further that no disease existed in the Dominion, had the satisfaction of seeing Canada removed from the schedule, since when Canadian cattle have had free access to the English markets, both at the seaports and at inland stations. Exporters of Canadian cattle

have practically abandoned the New England ports as places of shipment, and now utilise to the fullest extent the facilities offered by the St. Lawrence route. All cattle and sheep sent from Canada are submitted to veterinary inspection before shipment. Further proof of the extreme care which is taken to keep Canada out of the schedule is afforded by the fact that, on this side of the Atlantic, the High Commissioner for Canada, the Hon. Sir Charles Tupper, K.C.M.G., has maintained a rigid inspection of all live-stock passing either way between this country and the Dominion, and Mr. John Dyke, the able and courteous agent of the Canadian Government at Liverpool, exercises a watchful supervision over all cattle which arrive there from, or leave there for, Canadian ports.

So highly appreciated is the system of quarantine at Quebec, that a very large proportion of the cattle destined for the United States now enter by this route, and it is estimated that of cattle imported for States west of Ohio, fully 75 per cent. go by way of Quebec. The following statement not only illustrates the rapid growth in the importation of live-stock from Europe, but serves to show the number of animals which have been landed at Quebec since the establishment of the quarantine in 1876:—

|      | Cattle. | Sheep. | Pigs. | Total. |
|------|---------|--------|-------|--------|
| 1876 | 109     | 305    | 17    | 431    |
| 1877 | ..      | 124    | 38    | 162    |
| 1878 | 45      | 113    | 17    | 175    |
| 1879 | 114     | 369    | 6     | 489    |
| 1880 | 396     | 400    | ..    | 796    |
| 1881 | 701     | 1100   | 40    | 1841   |
| 1882 | 1209    | 1124   | 22    | 2355   |
| 1883 | 1867    | 603    | 41    | 2511   |
| 1884 | 1607    | 473    | 26    | 2106   |

An analysis of the imports at Quebec in 1882 gives the following results:—

|                      | Cattle. | Sheep. | Pigs. |
|----------------------|---------|--------|-------|
| For Canada .. ..     | 574     | 998    | 22    |
| For United States .. | 635     | 126    | ..    |
|                      | 1209    | 1124   | 22    |

The Canadian import was distributed among the various provinces thus:—

|                        | Cattle. | Sheep. | Pigs. |
|------------------------|---------|--------|-------|
| Ontario .. .. .        | 286     | 878    | 19    |
| Quebec .. .. .         | 244     | 117    | 3     |
| North-West Territories | 23      | ..     | ..    |
| Manitoba .. .. .       | 12      | ..     | ..    |
| Nova Scotia .. ..      | 8       | 3      | ..    |
| New Brunswick ..       | 1       | ..     | ..    |
|                        | 574     | 998    | 22    |

The following is a summary of the breeds imported in 1882:—

## CATTLE.

|                   | Short-horn. | Hercford. | Polled Angus. | Galloway. | Devon. | Sussex. | West Highland. | Shetland. | Ayrshire. | Jersey. | Holstein.* | TOTAL. |
|-------------------|-------------|-----------|---------------|-----------|--------|---------|----------------|-----------|-----------|---------|------------|--------|
| For Canada .. ..  | 90          | 31        | 323           | 56        | 7      | 10      | 19             | 5         | 17        | 16      | ..         | 574    |
| For United States | 14          | 142       | 263           | 166       | ..     | ..      | ..             | ..        | ..        | ..      | 50         | 635    |

All these cattle underwent a quarantine of ninety days from the date of sailing from the European port, and no disease of a contagious nature was found to exist amongst them.

## SHEEP.

|                         | Oxford Down. | Shropshire. | Southdown. | Hampshire Down. | Cheviot. | West Highland. | Leicester. | Cotswold. | Lincoln. | TOTAL. |
|-------------------------|--------------|-------------|------------|-----------------|----------|----------------|------------|-----------|----------|--------|
| For Canada .. ..        | 163          | 512         | 33         | 10              | 110      | 12             | 17         | 50        | 91       | 998    |
| For United States .. .. | 84           | 22          | ..         | ..              | ..       | 20             | ..         | ..        | ..       | 126    |

Thus, almost a thousand pure-bred sheep, many of them prize-winners, were imported in 1882. Ontario takes the lead both in importation and in exportation.

\* The cattle called "Holstein" on the American Continent are really Dutch. The true Holstein breeds are kept on the Marshes of Holstein, and very much resemble our unimproved and unpedigreed Shorthorns.—EDIT.

## PIGS.

|                  | Berkshire. | Suffolk. | TOTAL. |
|------------------|------------|----------|--------|
| For Canada .. .. | 18         | 4        | 22     |

This is less than half of the import of the preceding year, and indicates that hog-raising is not progressing in Canada. Both sheep and pigs are allowed to proceed to their destination if, on inspection at Quebec, they are found to be free from disease. The live-stock imported in 1884 through the Quebec quarantine were distributed as follows:—

|                     | Cattle. | Sheep. | Pigs. |
|---------------------|---------|--------|-------|
| To Canada .. ..     | 323     | 303    | 20    |
| To United States .. | 1284    | 170    | 6     |
| Total .. ..         | 1607    | 473    | 26    |

The Quebec quarantine has attracted so much notice in the United States, that in August, 1882, it was visited and inspected by the American Treasury Cattle Commission, whose function it was to establish and maintain a proper system of cattle quarantine for live-stock imported from Europe under the supervision of the Treasury Board at Washington, which controls all matters connected with the imports and exports of the country. The Sundry Civil Appropriation Bill of 1881 granted 10,000*l.* for the establishment of cattle quarantine stations at such ports as New York, Boston, Baltimore, and Philadelphia. But American importers, having got used to the Quebec route, like it so much, and the Grand Trunk Railway gives such facilities by running fast through cattle trains to Chicago, that it will require very considerable inducements to bring about a change. The cost, too, at Quebec (2*l.* to 3*l.*) is less than at the United States ports. Not only is Quebec the cheapest port for this trade, but it commands a shorter route, and the infected districts of the United States, east of the Alleghanies, are avoided.

It is necessary to add here that, for breeding purposes exclusively, American cattle are allowed to enter Canada, under strict quarantine, at Point Edward and one or two other places.

*Canadian Breeders.*—At this stage I may appropriately introduce a brief summary of the leading breeders of cattle in Canada. Commencing with Shorthorns, or Durhams, as they

are more commonly termed in the Dominion, the Hon. M. H. Cochrane, of Hillhurst, Compton, Province of Quebec, is the foremost breeder, not only in Canada, but in America. He achieved a great success with his celebrated cow, "10th Duchess of Airdrie," ten animals, all issue of this cow or of her daughters, having been sold by Mr. Cochrane for an aggregate of 32,900*l*. The principal importers of Shorthorns during recent years have included Mr. J. J. Davidson, Balsam, Ont.; Mr. Gibson, Ilderton, Ont.; Mr. Geo. Whitfield, Rougemont, P.Q.; Mr. Attrill, Goderidge, Ont.; and the Bow Park Co., Brantford, Ont.

During the four years, 1880-83, fully one-half of all the cattle imported by the St. Lawrence route were Herefords. Mr. Stone, Guelph, Ont., was about the first importer of this breed into Canada; while Mr. R. Pope, Cookshire, P.Q., now owns one of the largest and best herds in the Dominion. Rather more than thirty years ago, Mr. Killam, a farmer in the Eastern Townships, imported a Hereford bull, which was the first appearance of the breed in the Province of Quebec. The principal Hereford herds belong to the Hon. M. H. Cochrane; Mr. Dawes, Lachine, P.Q.; Mr. C. C. Bridges, Shanty Bay, Ont.; and Mr. Geo. Whitfield.

Passing on to Polled Aberdeen-Angus, in 1880 Mr. George Whitfield imported a very good lot of these cattle, including "Judge," a bull bred by Sir George McPherson Grant, of Ballindallock, Scotland, and two or three high-bred heifers. In the fall of the same year the Hon. J. H. Pope imported a bull and three heifers, and in 1882 this gentleman made a fresh importation of the finest specimens that could be got in Scotland. When Polled Angus were first sent as far west as St. Louis, a few years ago, the report spread that some *nigger cattle* had arrived!

The success which followed the introduction of the Polled Angus into Canada served to bring the Galloways into notice, especially as the demand for the former had very much hardened prices. Consequently, in 1882, a few Galloways were imported, though the first introduction of this breed into Canada was effected more than thirty years ago by Mr. McCrae, Guelph, Ont. Mr. Whitfield, Mr. D. Morris, St. Thérèse, P.Q., and Hon. M. H. Cochrane, Compton, have made recent importations.

Sussex and Devon cattle are practically unknown in Canada, as they are only to be seen on the model farm of Mr. Whitfield, at Rougemont, P.Q., and on the Ontario Experimental Farm, at Guelph, and there are a few in New Brunswick.

Ayrshires have been and still are very popular in Canada; but, so far as Ontario is concerned, the opinion is gaining ground that they are not suited to that Province. Up to the present

time, however, they may be seen in all the dairying districts both of Ontario and Quebec.

Jerseys are making rapid headway, both in Canada and in the United States. In 1883, Mr. V. E. Fuller's grand cow, "Mary Ann of St. Lamberts," 9770, secured an official record, made under the auspices of the Canadian Jersey Breeder's Association, of 24 lbs. 13 oz. butter in 7 days, and for  $3\frac{1}{2}$  days of the same week 13 lbs. 4 oz., being at the rate of 26 lbs. 8 oz. in 7 days. She was subjected to a continuous test of 93 days, and yielded 106 lbs.  $12\frac{1}{2}$  oz. in the first 31 days, 102 lbs. for the second 31 days, and 102 lbs.  $10\frac{1}{2}$  oz. for the third 31 days, making a total of 311 lbs. 7 oz. for 93 consecutive days, an average of 3 lbs.  $5\frac{1}{2}$  oz. per day; this celebrated cow is again referred to below. In his report to the Dominion Minister of Agriculture, for the year 1884, Mr. John Smith, the Government Agent at Hamilton, Ontario, says that last year there was a large demand for Jerseys on American account, the Canadians having established for themselves a reputation superior to that of any other breeders, either in the States or upon the island of Jersey itself. The Canadian herds are noted for their fine forms, great substance, and grand constitutions, and, as butter-makers, stand unrivalled, having never been approached by those of any other country. At the head of the tribe are the great "Stoke Pogis," "Victor Hugo," and "St. Helier" families, a combination of whose blood has developed a typical family possessing wonderful prepotency, as exhibited by the public tests made by the American Jersey Cattle Club at Oaklands, in the herd of Mr. Valancey E. Fuller. Some of the following figures will, no doubt, astonish English readers:—

PRICES obtained in 1884 for JERSEY CATTLE from the HERD of  
Mr. V. E. FULLER, OAKLANDS, HAMILTON, ONT.

|   | Total.  | Average per Head. |
|---|---------|-------------------|
|   | £       | £ s. d.           |
| Sale of eight cows .. .. .                | 3,150   | 393 15 0          |
| Sale of five bulls .. .. .                | 3,180   | 636 0 0           |
| Sale of eight bull calves .. .. .         | 3,070   | 383 15 0          |
| Sale of five heifers and heifer calves .. | 833     | 166 12 0          |
|   | £10,233 | £393 11 6         |
| Rent for services of five bulls .. ..     | 1,400   | ..                |
|   | £11,633 | ..                |

All the foregoing purchases were made for export to the United States. The bulls were likewise rented by American



breeders, the lowest rental for the season being 100*l.*, and the highest 500*l.*, for "Prince Pogis," a son of "Mary Ann," the service being limited to five cows. In addition to the Oaklands sales, American buyers have purchased freely from other Canadian herds rich in the blood of the St. Lamberts family, Mr. George Smith, of Grimsby, Ont., having obtained 1000*l.* for a "Stoke Pogis" and "Victor Hugo" cow. The following extraordinary figures were obtained in official tests made on the Oaklands Farm, in 1884, by the American Jersey Cattle Club, as mentioned above:—

| Name of Cow.                     | Quantity of Butter produced by<br>each Cow in Seven consecutive days. |     |
|----------------------------------|---|-----|
|                                  | lbs.  | oz. |
| Mary Ann of St. Lamberts .. .. . | 36  | 12½ |
| Ida of St. Lamberts .. .. .      | 30  | 2½  |
| Mermaid of St. Lamberts .. .. .  | 25  | 13½ |
| Naiad of St. Lamberts .. .. .    | 22  | 2½  |
| Niobe of St. Lamberts .. .. .    | 21  | 9½  |
| Total .. .. .                    | 136 lbs. 8 oz.  |     |

This gives the remarkable average of 27 lbs. 5 oz. of butter per cow per week. These figures are official, and I take upon myself no responsibility in reproducing them; I am unable to state what treatment the cows received before being submitted to the test, what was the condition of their health at the time, or what yields they gave in the weeks preceding or following the one recorded.

The Holstein or Dutch Friesian cattle are beginning to attract considerable notice, and some authorities incline to the opinion that these ponderous animals may ere long prove to be serious rivals to the Jerseys. The principal breeders and importers are Messrs. Lord, Cook and Son, of Aultsville, Ontario.

Professor Brown, in a letter to the Select Agricultural Committee of the Dominion House of Commons, maintains that one of the chief disadvantages Canadian stock-keepers labour under is the want of better pasture, and he advocates the establishment of permanent pasture such as has been formed at the Ontario Experimental Farm, and which is able to keep one and one-fourth beast per acre, while three acres of the ordinary kind are required for the support of one beast. There is further a need of better tree-shelter, a want of a greater number of pure-bred males, and a lack of knowledge of the adaptability of different breeds to the various conditions throughout the Dominion. Professor Brown is quite satisfied as to the suitability of different parts of the Dominion, both in the Eastern Provinces and in the North-West Territories, to the production of mutton and wool on a large and cheap scale.

*Store Cattle for England.*—The proposal to send store cattle over to England that they may be fattened in this country must not be overlooked. The subject has been discussed somewhat fully in the Canadian press by Professor Brown, who writes on the assumption that a market should exist for graded Shorthorn, Hereford, Aberdeen Poll, or Galloway steers, scaling 1000 lbs. to 1100 lbs., to be delivered in Liverpool or Glasgow, and fit for fattening off in six months. In Ontario they cannot produce a store steer weighing 1050 lbs. when 18 or 20 months old at less than 8*l.*, and one halfpenny per pound more would be required to make a certain profit, so that stores could not pass into shippers' hands at less than 10*l.* per head. Experience shows that it costs 4*l.* per head to send cattle across the Atlantic and land them at British ports, and, presuming the steers on arrival to be worth 16*l.* per head, this leaves a margin of 2*l.* profit to the parties who take all the risk. Then the question arises as to whether it would better pay the Canadian farmer to export his cattle as stores, or as ready for the butcher seven months later. In the latter case, instead of selling the animal as a store in September or October at 10*l.*, it is stall-fed up to May in such a way as to go out at 1400 lbs., worth, for export, not more than 3*d.* per pound live-weight. Its value is then 17*l.* 10*s.* to the feeder, or 75 per cent. more than the store price; but to effect this there has been an absolute cash outlay of 7*l.* 10*s.*, which reduces the value to 10*l.*, or actually no more than could have been secured seven months previously. It is concluded, therefore, that selling stores would be the more profitable, as the cattle would be converted into money seven months earlier, there would be greater inducement to stock-breeding, while more and better pasture would be brought into existence to promote cheap production. On the other hand, the loss of manure from the exported stores is not to be overlooked; nevertheless the opinion seems to be that the sale of stores to Britain would be highly beneficial to Canadian stock-farming, and Professor Brown maintains that the goal they ought to aim at should be to increase the exportation of beeves to 100,000, and at the same time to send Britain 50,000 stores per annum.

#### THE DAIRY INDUSTRY IN CANADA.

The unmistakable growth in the dairy industry at home during recent years has been reflected in a corresponding development elsewhere, and in no country more than in Canada. Professor S. M. Barré, of Montreal, whom I recently had the pleasure of meeting in Canada, has addressed to the Select Agricultural Committee of the Dominion House of Commons a

paper embodying his views as to the present position and the requirements of dairy farming in Canada; and his extensive knowledge of dairying as practised in various European countries, coupled with his practical experience in the management of the Provincial Creamery of Quebec, lends considerable authority to his opinions, which I shall briefly summarise.

Dairying is now the most productive agricultural industry in Canada. During the last few years the export of dairy produce has represented an annual value of 1,600,000*l*. For the year ending 30th June, 1883, Canada exported to England alone 57,672,959 lbs. of cheese and 6,230,173 lbs. of butter. As there is, presumably, both in England and on the continent of Europe, a large, constant, and steadily increasing market for Canadian cheese and butter, the possible development of the dairy industry in the Dominion is practically unlimited. Of agricultural industries, dairying is the one which yields the surest, most uniform, and most abundant results, and from both the agricultural and the commercial point of view is the one best suited to all the older Provinces.

Cheese-making is one of the best understood and most productive industries of the country. The average quality of the cheese of Ontario is superior to that of Quebec; and though the latter Province produces some cheese quite equal to the best Ontario makes, there is in both Provinces considerable room for improvement. For cheese-making, Ontario has carried off three first prizes in competition against the whole world, at international exhibitions; and though the Maritime Provinces, being nearer the sea-board, have greater facilities for export, they are yet behind the premier Province in the art of making cheese. In 1873 the export of cheese from Canada was only about 15,000,000 lbs., while for the entire year of 1883 it had risen to nearly 60,000,000 lbs. The leading defect in the cheese industry in the Province of Quebec is in the mode of packing, the boxes used not being suited to the purpose. The curing of the cheese is defective at the opening of the dairy season, at its close, and during the great heat of summer, and this is attributed to the fact that the factories are too slightly built, and are incapable of protecting the product from the influence of the atmosphere. The remedy suggested is to impart to a sufficient number of intelligent men the knowledge of the best style of cheese-making in Ontario, and to employ them as instructors, and as inspectors of cheese factories, wherever the manufacture is defective. Also, to diffuse by means of the press the knowledge requisite for the making of good cheese, and for the establishment of efficient cheese factories.

Butter-making is much less advanced than cheese-making. The cheese industry got the start some fifteen years ago by the establishment of co-operative or public cheese factories, and it is only recently that attention has been directed to the institution of public creameries. Moreover, the principles which govern cheese-making were early studied by such skilful manufacturers as Mr. Ballantyne, of Stratford-on-Avon, Ont., and others, and a knowledge of the art rapidly spread. The success which ensued, and the high price of cheese some years ago, induced farmers, particularly in Ontario, to devote themselves to cheese-making. Among other adverse influences checking the development of the butter industry were the inefficiency of the appliances, the want of the necessary knowledge for an intelligent prosecution of the industry, the absence of methods specially adapted to the circumstances and requirements of the country, and the poor reputation of Canadian butter on foreign markets. The Provincial Government of Quebec having taken the matter up, that Province is now ahead of Ontario in the quality of its butter. The census of 1881 returns the production of home-made butter in Canada as 102,000,000 lbs., from 3,000,000 to 4,000,000 lbs. being the output of creameries. The total export of butter for the year ending 30th June, 1880, amounted to 19,887,703 lbs., and for the year ending 30th June, 1883, to 8,106,447 lbs., thus showing a decrease of 11,781,256 lbs. The average price of butter in Canada may be put at 9*d.* per lb., but it varies from 7½*d.* or 8*d.* west of Toronto, to 11*d.* at the creameries. Taking the average price of Danish butter on the English market at 15*d.* to 17*d.* per lb., it is thought that though Canadian butter would not command so high a price as Danish, yet by improvements in manufacture and in means of transport, the average price of the Canadian product might be increased by at least 3*d.* per lb.; and an increase in the price would bring about a considerable increase in the production. The defective butter-making of most Canadian farmers, especially those who have only a small number of cows, is due to want of knowledge of the process and to lack of time. The ordinary occupations of a farmer's wife are too numerous and too varied to permit of her giving the requisite time and care to butter-making, and the cost of hired labour is too great for any relief to be obtained from this source; hence the making of good butter for export is an impossibility on seven-eighths of Canadian dairy farms. The remedies suggested are to diffuse sound knowledge as to butter-making by pamphlets and other means, and to establish public dairies or creameries. Then, again, the butter that is made cannot be relied upon for uniformity of quality, and this is due

to the absence of uniformity in the methods of making and in the generally accepted principles; moreover, the butter is too frequently made by inexperienced persons who possess neither skill nor taste for the work. It is believed that this defect might be lessened by the adoption of methods specially suited to the requirements of the country, and by the inculcation of one sole theory, scientifically studied and practically tested by intelligent disinterested men, at an experimental station. It is not generally known that two kinds of butter are made in Canada, both considered of first quality but each serving a different purpose. The one has a very marked flavour, as French and American butter, and keeps for a shorter time; the other has a less pronounced flavour, as the Dominion butter, but keeps longer. The latter kind is in every way the better suited to Canada, where the dairying season lasts only seven months of the year, and it is, of course, only this kind which is properly suited to foreign export. Here, again, the desirability of an experimental station is insisted on, as it is believed that this would constitute the best means of diffusing a knowledge of making butter with long-keeping properties. Another difficulty presents itself when Canadian butter is brought into competition with other butter on foreign markets, and this arises from the fact that dairy farmers in Canada hold their butter too long a time. Thus, while the French, as a rule, send their butter to England eight or ten days after it is made, the Germans within a fortnight, and the Danes within three or four weeks of its production, Canadian butter often remains four, five, six, and even eight months in the farmers' hands. A remedy is once more suggested in the establishment of creameries, the existence of which would, owing to the quantity of butter made, render it possible to effect weekly shipments, a proceeding which is out of the question when the butter is only made in small quantities by each farmer. Supposing the article to be shipped from the factory weekly, and allowing two weeks for the Atlantic voyage, and an interval of another week before the consumer is reached, there is then nothing to prevent Canadian butter being in the hands of the consumer within four or five weeks of the time of its production.

From what has been said, it is abundantly evident that, in order to improve the quality of Canadian butter, to ensure uniformity in the product, and to facilitate immediate shipment to foreign markets, Professor Barré advocates the general establishment of butter factories, as the most powerful lever that could be brought to bear on the development of the butter industry. But to make these factories a commercial success,

a staff of skilful and experienced dairymen is a necessity, and the only way to get such men is to educate them, and for this object the establishment of dairy schools throughout the country is advocated. Further, to teach butter-making in such schools, there must be a definite theory of the process, scientifically studied and practically worked out, and this, it is maintained, involves the establishment of an experimental dairy station of the kind at present existing in large numbers on the continent of Europe. The theory studied at the experimental station would be taught in the dairy schools, practised in the butter factories, and so be the means of diffusing a sound practical knowledge of butter-making amongst the farmers in general. In short, the system of teaching, both theoretical and practical, which is advocated, is similar to that which is in operation in Denmark.

Professor Arnold, of Rochester, New York State, who has devoted his life to the study of dairying, and whose name is well known on this side of the Atlantic, gave some exceedingly valuable evidence before the Select Committee. He attributes the defects in cheese-making in Canada to a want of skill on the part of the manufacturers, and to a deficiency in the quality of the rennet. Notwithstanding the appreciation in which Canadian cheese is held on the English market, there is not 5 per cent. of it equal to what it might be; the difference in price, however, is no criterion of the difference in merit, for poor cheese is sold at a higher, and good cheese at a lower, rate than its true value. In Professor Arnold's own district efforts are being made to overcome the drawback associated with inferior rennet, but they make only slow progress. Numerous establishments are supplied with perfectly pure "liquid pepsine," free from any other animal matter. It is distributed by the quart or the gallon to the dairymen, as they prefer. In the preparation of rennet, manufacturers are apt to get it tainted, and it will even undergo putrefaction, in which condition it injures the quality of the cheese very materially. The stuff used by some of the dairymen in Canada and the States is surprising, and four inspectors reported that they found 75 per cent. of the factories they visited using rennet that was actually putrid, while the rest were using good material or rennet extract. As the extract costs a little more than the raw stomach, its introduction progresses but slowly. The Government might help to improve matters if they would find funds to enable the dairymen's associations to pay in part for the extract, so that the dairymen could procure it as cheaply as they get the rennet. The dairymen would prefer the extract, because it saves them a great deal of labour, and is not such a

nasty mess to manipulate as the rennet is. The main cause of sourness in cheese arises from letting the curd lie in the whey while it is hardening, until the whey gets sour. The acid then counteracts the effect of the rennet ferments, which should cure the cheese, and as a consequence the cheese does not cure.

With regard to butter-making, Professor Arnold is of opinion that Canada is losing fully 1,000,000*l.* per annum through defective methods, chiefly want of care in the management of the milk, especially in setting it to obtain the cream, and in the manipulation during the making of butter. The more extended the use of machinery becomes the better, as it will leave less to the skill and manipulation of the workman. Canadian butter does not fetch on the English market a lower price than American butter, the reason being that the Canadian export is mostly of the best grades, whereas the good American butter is all consumed in the States, and only the very lowest grades are exported. The American makers never export any butter that is worth more than 11*d.* per pound. The establishment of creameries is a step in the right direction; they help to educate dairy farmers, and they turn out an article whose uniform quality goes a long way towards marketing it. In a sparsely populated country creameries are distinctly advantageous because the butter is all produced at centres where it can be most favourably sold. If a purchaser can go to a creamery and buy a thousand pounds of butter at once, he can afford to pay a better price than he could if he had to travel about and collect the same quantity; and the fact that the butter is all of one quality adds further to its value. Creameries are very successful in the States, not that there they make better butter than the private dairies, but they make all one quality. The creamery, however, does not divide the proceeds equally, as the milk is valued by the pound, so that rich milk from generously fed cows commands no better price than poor milk. In the States, creameries are the most prosperous, do the best business, and give the greatest satisfaction in the West, where butter-making is just being introduced. But in the East they are not now so much in vogue, as dairymen prefer to make their own butter at home, and so get better value from their milk. As regards the drying up of pastures in the summer, Canada does not suffer so much as the United States, there being more summer rain in the former country, so that in the northern parts of Canada the grass remains fresh and green through most of the summer. In the States it gets very dry, especially in the West, where the middle of the season is marked by a long dry spell, so that cattle lack both food and drink; and when they are once allowed to run down, the quantity of milk is reduced,



and the former flow is not recovered even if the cows are well supplied with food afterwards. The cultivation of peas, oats, millet, green corn, or some other succulent food, is recommended to make good the defect in the pastures during summer.

Some important features in the commercial aspects of Canadian dairying were brought forward in a valuable paper, read before the Western Dairymen's Convention, at London, Ontario, on the 14th of February, 1884, by Mr. E. A. Barnard, Director of Agriculture in the Department of Agriculture and Public Works, Quebec. In 1858 the exports of cheese were purely nominal, but since then there has been an almost continuous increase down to 1883, in which year the largest export took place. The history of the butter trade is very different. In 1862, before confederation, the united Provinces of Ontario and Quebec (Upper and Lower Canada) exported more butter than the whole confederation of Canada does now, the exports for 1883 and 1884 having been less than that for 1862, though it must be admitted that 1883 and 1884 were exceptionally bad years. The following figures, taken from the Trade and Navigation Returns, show that the butter trade has been practically at a standstill since 1871:—

## TOTAL EXPORTATIONS of CHEESE and BUTTER from CANADA.

| Cheese.    |           | Year. | Butter.    |         |
|------------|-----------|-------|------------|---------|
| Lbs.       | Value.    |       | Lbs.       | Value.  |
|            | £         |       |            | £       |
| 13,104     | 300       | 1858  | 3,721,200  | 96,142  |
| 36,156     | 933       | 1859  | 3,750,296  | 105,259 |
| 124,320    | 3,240     | 1860  | 5,512,500  | 158,524 |
| 294,336    | 4,787     | 1861  | 7,275,426  | 168,329 |
| 491,680    | 9,845     | 1862  | 8,905,578  | 226,554 |
| 974,736    | 24,700    | 1866  | 10,448,789 | 418,854 |
| ..         | ..        | 1867  | 10,817,918 | 348,258 |
| 1,577,072  | 38,711    | 1868  | 9,956,448  | 317,545 |
| 6,111,482  | 143,589   | 1869  | 10,853,268 | 468,454 |
| 5,827,782  | 134,897   | 1870  | 12,259,887 | 470,714 |
| 8,271,459  | 221,981   | 1871  | 15,439,266 | 613,046 |
| 16,424,025 | 368,057   | 1872  | 10,068,448 | 722,536 |
| 15,208,633 | 456,082   | 1873  | 15,205,663 | 641,796 |
| 24,050,982 | 704,640   | 1874  | 12,233,046 | 524,061 |
| 32,342,030 | 777,245   | 1875  | 9,268,044  | 467,465 |
| 37,885,286 | 810,001   | 1876  | 12,392,367 | 515,886 |
| 37,700,921 | 779,593   | 1877  | 15,479,550 | 644,996 |
| 39,371,139 | 824,260   | 1878  | 13,504,117 | 494,839 |
| 49,616,415 | 806,950   | 1879  | 14,536,246 | 427,689 |
| 43,441,112 | 818,809   | 1880  | 19,887,703 | 623,832 |
| 54,713,020 | 1,218,307 | 1881  | 17,820,278 | 722,378 |
| 55,325,167 | 1,195,907 | 1882  | 15,338,488 | 595,034 |
| 58,041,387 | 1,290,380 | 1883  | 8,106,447  | 341,165 |
| 75,835,557 | 1,564,724 | 1884  | 8,473,976  | 334,953 |



TABLE showing the EXPORTS of CHEESE and BUTTER from CANADA to the UNITED KINGDOM for the NINE YEARS, from 1876 'o 1884, inclusive.

(From the Trade and Navigation Returns.)

| Cheese,    |           | Year. | Butter,    |         |
|------------|-----------|-------|------------|---------|
| Lbs.       | Value.    |       | Lbs.       | Value.  |
|            | £         |       |            | £       |
| 33,927,697 | 727,926   | 1876  | 9,430,712  | 395,181 |
| 33,659,159 | 689,462   | 1877  | 12,997,380 | 549,326 |
| 36,331,358 | 760,329   | 1878  | 11,031,366 | 409,768 |
| 43,959,028 | 717,863   | 1879  | 12,656,567 | 378,322 |
| 39,153,726 | 754,554   | 1880  | 16,687,978 | 551,213 |
| 48,913,873 | 1,094,272 | 1881  | 16,282,376 | 666,682 |
| 50,555,644 | 1,094,335 | 1882  | 11,183,746 | 439,025 |
| 57,672,959 | 1,281,971 | 1883  | 6,230,173  | 266,117 |
| 69,338,074 | 1,441,485 | 1884  | 6,889,713  | 279,130 |

The unsatisfactory condition of the butter industry is considered due to the fact that at present it apparently pays better to make cheese, and that the unsteadiness of the demand for Canadian butter also operates adversely. The export market for Canadian butter is undoubtedly Great Britain, as 80 per cent. of the export is absorbed in this country. But England wants the best brands only; and while the highest grades of imported butter are quoted in England at from 120s. to 144s. per cwt., Canadian and even American brands can only command from 60s. to 122s. Canadian dairy practices compare most unfavourably with those of Denmark,\* and while the Canadian butter trade with England has stood still and even undergone retrogression since 1872, the exports of Danish butter to the English market have steadily increased by nearly 100 per cent. during the same period. The yearly export from Holland, again, to the English market has increased since 1872 nearly 200 per cent., and, however much this may be due to oleo-margarine, the Dutch produce is quoted at much higher figures than the Canadian. So with the United States, while the Canadian export was at a standstill, that from the States increased nine-fold in the six years 1874 to 1879. These facts place the very poor quality of Canadian butter beyond dispute, and the largest exporters of butter in Montreal estimate the character of the output thus: finest Canadian butter, 5 to 10 per cent.; fine ditto, 25 to 30 per cent.; poor ditto, 50 to 60 per cent. While Canadian farmers think cheese-making pays better than butter-making, the contrary seems to be the ex-

\* See the paper on "Dairying in Denmark," by H. M. Jenkins, F.G.S., in this 'Journal,' Second Series, vol. xix. 1883, p. 155.

perience of Denmark and Holland; in these countries butter is the principal industry, and such cheese as is made comes from milk more or less skimmed, and, in the case of Holland, for example, the quantity shipped to England and the prices obtained for such skim cheese compare most favourably with the Canadian exportations of whole-milk cheese.

An important economical question arises whether it would be prudent to increase very largely the production of Cheddar cheese—the only kind made in Canada, as a rule—over what it is at present. That such an increase, even at the rate of ten-fold in a very few years, is practicable there can be no doubt. Thus, in the Province of Quebec alone, not a single cheese factory existed in the French settlements up to 1872, and now these same settlements produce nearly one-fourth of all the cheese manufactured in Canada, and there is still room for an increase of a hundred-fold. From the Maritime Provinces, where the facilities for making butter and cheese are at least equal to those of Quebec, hardly any cheese is exported. The following Table, from the Trade and Navigation Returns, 1883, is interesting, as it conveys a good idea of the present exporting capacity of the several Provinces named:—

TOTAL EXPORT OF CHEESE AND BUTTER from the CANADIAN PROVINCES in 1883.

| Cheese.    |                          | Province.                | Butter.   |          |
|------------|--------------------------|--------------------------|-----------|----------|
| Lbs.       | Value.                   |                          | Lbs.      | Value.   |
|            | £                        |                          |           | £        |
| 12,365,079 | 276,200                  | Ontario .. .. .          | 1,537,586 | 65,455   |
| 45,655,038 | 1,013,636                | Quebec .. .. .           | 6,048,912 | 255,680  |
| 15,081     | 418                      | Nova Scotia .. .. .      | 477,372   | 18,272   |
| 135        | 3                        | New Brunswick .. .. .    | 20,199    | 899      |
| 12         | $\frac{1}{2}$            | British Columbia .. .. . | 67        | 6        |
| 6,042      | 123                      | Prince Edward Island ..  | 22,311    | 853      |
| 58,041,387 | £1,290,380 $\frac{1}{2}$ |                          | 8,106,447 | £341,165 |

But the imports of cheese into Britain during the last few years do not show that increase which would seem to call for an increased export from Canada. Our imports of cheese from all sources were, in—

|              |           |       |
|--------------|-----------|-------|
|              |           | cwts. |
| 1879 .. .. . | 1,789,168 |       |
| 1880 .. .. . | 1,773,503 |       |
| 1881 .. .. . | 1,834,480 |       |
| 1882 .. .. . | 1,692,495 |       |
| 1883 .. .. . | 1,797,080 |       |
| 1884 .. .. . | 1,926,070 |       |

Hence, if the present tendency towards increasing the output of cheese in Canada continues, the surplus can only be disposed

of on the English market by its being able to outrival the American cheese with which it is in competition.

It has been shown that, when every element is considered, and in a series of years, butter-making pays the Canadian farmer fully as well as cheese-making. One hundred pounds of standard milk will make, in Ontario,  $9\frac{1}{2}$  lbs. of cheese, or 4 lbs. of butter; whey is considered of little account, being valued at about  $2\frac{1}{2}d.$  per 100 lbs. Hence, we get—

|  | s. | d.              |
|--|----|-----------------|
| $9\frac{1}{2}$ lbs. cheese, at say $5d.$ net, a high average .. .. . | 3  | $11\frac{1}{2}$ |
| Whey .. .. .   | 0  | $2\frac{1}{2}$  |
| Total .. .. .  | 4  | 2               |
| 4 lbs. butter at $10d.$ net .. .. .                                  | 3  | 4               |
| Skim-milk .. .. .  | 0  | 10              |
| Total .. .. .  | 4  | 2               |

And since, in calf feeding or pig raising, sweet skim-milk is worth one-half of the whole-milk,  $10d.$  is less than the real value to a careful farmer; and it has been shown in some of the Government experimental stations in the United States that, under proper care, 100 lbs. of skim-milk will produce  $6\frac{1}{4}$  lbs. of pork, live-weight.

As regards future markets for butter, Canadian dairy farmers rely upon the home demand, which is expected to increase many fold when really good butter becomes as common as it is now scarce; then there is the English market, where the *best* butter is always in request; and there are, further, all the markets of the world, which the United States are now opening up for Canada as well as for themselves. Only about two-thirds of the United States exports in butter reach Britain; and even the Dominion imports upwards of 250,000 lbs. from this source, irrespective of more than half a million pounds sent from the States into Newfoundland, Labrador, Miquelon, and St. Pierre, which would evidently derive their supply from Canada, were Canada able to provide it. The fact that the well-known butter manufacturer, Mr. Valancey Fuller, of Hamilton, Ontario, has shown how to produce 850 lbs. butter in a year, worth 1s. per pound, from a cow weighing about 1000 lb. live-weight, on no more food than it would take to produce 750 lbs. of matured beef, live-weight, in the same time, and worth  $2\frac{1}{2}d.$  per pound, distinctly indicates on which side the profit lies when dairying and meat raising are pitted against each other in Eastern Canada.

Messrs. A. A. Ayer and Co., Montreal, the largest exporters of butter and cheese from Canada, and perhaps from the American continent, are of opinion that the Government can best promote the increased production and better quality of cheese by employ-

ing skilled makers of cheese to visit the various factories and give instruction. They believe that three skilled practical instructors in Ontario, and three in the Province of Quebec, engaged each at a salary not to exceed 200*l.* per annum, would result in a gain of from 10,000*l.* to 20,000*l.* to the country, and possibly twice this amount. The Dairymen's Association of Ontario have already got this matter in hand. The butter problem in Canada is a more difficult one than that of cheese, and large losses will probably be incurred by farmers and merchants during the period of transition from the practice of making butter on the farm to that of manufacturing it in the creameries. It is suggested that the Government might foster the butter industry by giving a bonus, of, say, 200*l.* to each butter factory or creamery that shall be established and worked under certain fixed regulations; for the present this might be limited to one factory in each county, and not more than one-fourth, or at the most one-third, of the counties in Ontario and Quebec are butter-making counties.

#### THE PROVINCE OF ONTARIO.

Ontario, the premier Province of Canada, in population, in wealth, and in progress, consists in its northern part of a well-watered forest region, and in its southern part—that, namely, which is bounded on the east and south by Lakes Ontario and Erie, and on the west by Lake Huron and Georgian Bay—of a fertile farming country. This latter, too, was once forest, as is testified by the numerous tree-stumps still left in the ground, between which the plough has to be guided in its devious course. Around many of the farm homesteads there is an air of comfort and prosperity, particularly in the south of the Province; but here, as everywhere else in Canada, the hedgerows which constitute so common and picturesque a feature in English rural scenery are not to be seen, their place being taken by the snake fences which, with their zigzag outline, determine the boundary between adjacent fields. By a recent decision of the Judicial Committee of the Privy Council, a tract of land 80,000 square miles in area, lying to the north and west of Lake Superior, has been added to Ontario, the area of which is now nearly 200,000 square miles. Toronto, the capital, and the seat of the Provincial Government, has a population of 102,000; Hamilton, 36,000; Ottawa, the administrative capital of the Dominion, 28,000; London, 20,000; Kingston, 15,000.

The Ontario Bureau of Industries was established in 1881, and its first work was to make a report of crop statistics, live-stock, &c., in 1882. Schedules of questions are circulated freely through the Province, and the Bureau issues an agricul-

tural report several times in the course of the season. Included in the information collected in 1882 were the following items: total area of land in farms, 19,622,429 acres, of which 10,218,631 acres were cleared. Value of farm land, 126,468,500*l.*; of buildings, 26,542,515*l.*; of implements, 7,405,963*l.*; and of live-stock, 16,108,144*l.*; making the total value of farm property, 176,525,122*l.* Besides the usual farm crops there were: of flax, 6157 acres; hops, 2051 acres; orchard and garden, 213,846 acres. In addition to 1,562,683 grade and native cattle, there were 23,619 thoroughbred cattle, namely, 15,385 Durhams, 1438 Devons, 841 Herefords, 270 Aberdeen Polls, 1189 Galloways, and 4496 Ayrshires. The cheese factories in the Province numbered 471, and returns from 306 of these showed that 25,562,431 lbs. cheese were made, valued at 553,417*l.* The extent to which underdraining was being carried on was shown by the fact that one-third of the tile-yards in the Province from which returns were received made enough tiles in 1882 to lay more than 1000 miles of drains.

The average rent per acre of leased farms in 1884 was 11*s.*, the figures ranging as low as 4*s.* 1*d.* in Muskoka county and as high as 14*s.* 4*d.* in Durham county. The average wages of farm hands per year with board were 33*l.* 8*s.*, the minimum being 29*l.* 12*s.* in Welland county, and the maximum 39*l.* 4*s.* in Algoma county. The average wages per year without board were 51*l.* 8*s.*, ranging from 43*l.* 12*s.* in Parry Sound county to 61*l.* 12*s.* in Algoma county. Monthly wages with board averaged 3*l.* 18*s.*, the lowest being 3*l.* 10*s.* in Brant county, and the highest 4*l.* 15*s.* in Algoma county. Monthly wages without board averaged 5*l.* 16*s.*, ranging from 5*l.* 2*s.* in Prince Edward county to 6*l.* 12*s.* in Algoma county. During the first half of 1884 the average prices in the Province of the following agricultural produce per bushel were: fall wheat, 4*s.* 1*d.*; spring wheat, 4*s.* 2*d.*; barley, 2*s.* 6*d.*; oats, 1*s.* 9*d.*; peas, 3*s.*; rye, 2*s.* 6*d.*; Indian corn, 2*s.* 1*d.*; beans, 6*s.* 3*d.* On the Toronto live-stock market the average prices per cwt. were: for cattle, 1*l.*; calves, 2*l.*; sheep, 1*l.* 1*s.*; pigs, 1*l.* 7*s.* Professor Brown wrote me, under date of 19th December, 1884, "In Ontario markets at present store cattle fetch from 3½ to 4½ cents. per lb., weighing on an average about 900 lbs. Export cattle for the butcher are worth 5½ cents. on an average, tops 6 cents. For best Christmas beef 7 and 8 cents. are obtained, but the market is limited." Substitute the halfpenny for the cent. to get the English value.

The following Tables from the Agricultural Returns to the Bureau of Industry, August 1st, 1884, will convey a fair idea of the present condition of agriculture in the Province of Ontario:—

TABLE showing the AREA and PRODUCE of FARM CROPS in ONTARIO in 1883 and 1884.

|                    | 1883.     |                 | 1884.     |                 |
|--------------------|-----------|-----------------|-----------|-----------------|
|                    | Acres.    | Bushels.        | Acres.    | Bushels.        |
| Fall Wheat .. ..   | 1,036,206 | 11,644,005      | 864,551   | 18,479,207      |
| Spring Wheat .. .. | 586,410   | 9,726,063       | 722,410   | 13,251,137      |
| Barley .. ..       | 757,156   | 18,414,337      | 701,435   | 17,860,777      |
| Oats .. ..         | 1,418,309 | 54,573,609      | 1,485,620 | 53,195,805      |
| Rye .. ..          | 188,111   | 3,012,240       | 104,141   | 1,621,667       |
| Peas .. ..         | 542,771   | 10,673,723      | 570,628   | 13,253,986      |
| Indian Corn .. ..  | 214,237   | ..              | 174,834   | ..              |
| Buckwheat .. ..    | 67,802    | ..              | 65,921    | ..              |
| Beans .. ..        | 25,907    | ..              | 24,877    | 552,953         |
| Hay .. ..          | 2,350,969 | Tons. 4,115,535 | 2,193,369 | Tons. 3,044,912 |
| Potatoes .. ..     | 166,823   | ..              | 168,862   | ..              |
| Mangolds .. ..     | 17,219    | ..              | 18,314    | ..              |
| Carrots .. ..      | 11,270    | ..              | 10,980    | ..              |
| Turnips .. ..      | 98,429    | ..              | 104,108   | ..              |
| Pasture .. ..      | ..        | ..              | 2,794,986 | ..              |

TABLE showing the NUMBER of LIVE STOCK in ONTARIO in 1883 and 1884.

|                           | 1883.          | 1884.          |
|---------------------------|----------------|----------------|
| Horses .. ..              | 560,133        | 535,953        |
| viz. Working Horses .. .. | 349,552        | 303,474        |
| Breeding Mares .. ..      | 87,380         | 93,910         |
| Unbroken Horses .. ..     | 123,201        | 138,569        |
| Cattle .. ..              | 1,818,054      | 1,925,670      |
| viz. Working Oxen .. ..   | 17,071         | 16,793         |
| Milch Cows .. ..          | 690,437        | 710,519        |
| Store Cattle over 2 years | 321,471        | 384,453        |
| Young and other Cattle    | 789,075        | 813,905        |
| Sheep .. ..               | 1,868,784      | 1,890,733      |
| viz. Coarse Woolled:      |                |                |
| Over 1 year .. ..         | 1,043,080      | 994,608        |
| Under 1 year .. ..        | 580,095        | 595,996        |
| Fine Woolled:             |                |                |
| Over 1 year .. ..         | 150,281        | 176,341        |
| Under 1 year .. ..        | 95,328         | 123,788        |
| Pigs .. ..                | 906,727        | 916,158        |
| viz. Over 1 year .. ..    | 245,996        | 257,711        |
| Under 1 year .. ..        | 660,731        | 658,447        |
| Poultry .. ..             | 5,847,344      | 6,237,606      |
| viz. Turkeys .. ..        | 355,635        | 445,532        |
| Geese .. ..               | 491,093        | 540,130        |
| Other Fowls .. ..         | 5,000,616      | 5,251,944      |
| Wool, total clip .. ..    | lbs. 6,608,418 | lbs. 6,518,918 |

I have included wool in the foregoing Table, and may add that the average weight of the fleeces in 1884 was: coarse wool, 5.55 lbs.; fine wool, 5.12 lbs.

The following Table of average yields of field crops in Ontario in 1883 and 1884 is also made up from the Agricultural Returns to the Bureau of Industry:—

|                    | Bushels per Acre. |       |                   | Bushels per Acre. |       |
|--------------------|-------------------|-------|-------------------|-------------------|-------|
|                    | 1883.             | 1884. |                   | 1883.             | 1884. |
| Fall Wheat .. ..   | 10.5              | 21.0  | Buckwheat .. ..   | 25.2              | ..    |
| Spring Wheat .. .. | 16.7              | 20.0  | Potatoes .. ..    | 96.3              | ..    |
| Barley .. ..       | 24.7              | 25.0  | Mangolds .. ..    | 361.0             | ..    |
| Oats .. ..         | 39.0              | 36.0  | Carrots .. ..     | 349.0             | ..    |
| Rye .. ..          | 16.0              | 16.0  | Turnips .. ..     | 298.0             | ..    |
| Peas .. ..         | 19.8              | 24.0  |                   | Tons.             | Tons. |
| Beans .. ..        | 20.7              | 22.0  | Hay and Clover .. | 1.75              | 1.50  |

Although it is only about twenty years since the first herd of thoroughbred Shorthorns reached Canada, the improvement which has taken place in the cattle of the Dominion since then is very marked, and nowhere more so than in Ontario, where the business of raising and feeding stock for the market has led to necessary and considerable modifications in the primitive style of agriculture which formerly prevailed there. In face of the vast wheatfields now opening up in the West, the premier Province will have to take a second place in the extensive and cheap production of cereals, and to turn more attention to the development of stock-breeding and dairy-farming. On some of the older farms the limits of the unaided fertility of the soil have been reached, and even exceeded, so that the subject of fertilisers is now exercising the minds of the leading agriculturists of the Province. Professor J. T. Bell, of Albert College, Belleville, writes: "The fertiliser in general use is barnyard-manure, much of which loses most of its efficacy by being allowed to lie for months in the open, exposed to the action of the sun and rain, which alternately vaporise the volatile and dissolve out the soluble parts, until only the *caput mortuum* of the dunghill remains. There is also a deficient supply of artificial manures." Professor Brown, on the other hand, writes that the result of experiments on the use of apatite, gypsum, and other fertilisers "goes to establish what might be matter of gratification to the country—that its wonderfully fertile climate, in conjunction with system and the best management and use of farmyard-manure, renders the extensive use of special fertilisers comparatively valueless. I am aware



that such an opinion will be challenged." At a meeting of farmers held at Belleville on 13th March, 1884, it was resolved to report to the Select Agricultural Committee that the following are among the present deficiencies of Ontario farming: "Want of proper drainage, especially subsoil drainage. Want of care in preparing and applying barnyard-manure. Absence of artificial manures. Neglect to extirpate weeds. Root-growing discouraged by the scarcity and high price of labour. The breeds of sheep and cattle should be improved by the importation of high-class animals. A systematic and uniform mode of butter-making is the great want. The cultivation of such fruits as are most suitable for exportation ought to be encouraged."

That branch of dairying which is concerned with cheese-making is an undoubted success in Ontario, a success attributable to the development of the factory system. Each factory is usually conducted on the co-operative principle; the milk is collected by a waggon sent round from the factory, tested by a lactometer to ascertain if it is of standard quality, and each farmer credited with the quantity supplied. The returns, less expenses, are divided among the contributors, or "patrons." The interests of the dairy industry are carefully fostered by two incorporated Dairymen's Associations in the eastern and western sections of the Province respectively, and regular cheese-markets are established at various centres. In 1882, the returns made to the Government from 266 factories gave 85,226 as the number of cows whose milk was supplied; and the average return to each patron, of whom there were 13,349, was 33*l.*, while the average value of cheese per cow was 5*l.* An average made up from 306 factories gave 10.6 lbs. milk (say 1 gallon) to 1 lb. cheese, the cheese being valued at 5*d.* per lb. The standard yield of milk per cow was 3000 lbs. (say 300 gallons). Only sixteen creameries were in operation in 1882; in two of them 24,822 inches of cream produced 23,411 lbs. of butter, and in two others 1,753,241 lbs. of milk yielded 64,807 lbs. of butter, equivalent to 27 lbs. milk to 1 lb. butter. The total quantity of butter made in the Province, chiefly at farmhouses, was in 1882, 306,567 cwt., and in 1883, 293,252 cwt.

Under the sunny sky of southern Ontario, where the small but graceful humming-birds have their summer home, fruit-culture is practised on a large and successful scale. Nearly 100 varieties of apples are cultivated, besides crab-apples, pears, plums, peaches, and grapes. Unfortunately, nearly all the apples that reach the English market from across the Atlantic are classed as American apples, whereas the general



character of the American product is somewhat inferior to that of the Canadian. The crisp flesh, copious juice, and fine flavour of a Canadian russet, or of a Nova Scotian Gravenstein, are in marked contrast to the dry texture and insipid flavour of very many of the American varieties. Apples form the great bulk of the green fruit exported from Canada; this is a rapidly extending industry, for in 1869 the value of this export was less than 5000*L.*, whereas a dozen years later it exceeded 100,000*L.* The peaches are delicious, if I may judge by some I purchased near Niagara at the rate of two a penny. Peach orchards, containing from 3000 to 10,000 trees, are common. The summer trade in strawberries is enormous; they are delivered in shiploads at the lake-ports. The culture of grapes is increasing, and the largest vineyards are in the counties of Wentworth, Welland, Lincoln, Kent, and Essex. The manufacture of wine from the grape is a growing industry.

The southern part of the Province, embracing an area of about 25,000,000 acres, is highly favoured, both in its climate and in its soils. Mr. John Carnegie, of Peterborough, Ont., has pointed out that the last Census Returns of Canada and the United States show that, when compared with the seven largest producing States, in each of seven cereals, Ontario, notwithstanding that she is thus brought into competition with twenty-two States, secures a first place as a producer of barley, of peas, and of beans; a third place as a producer of oats and of buckwheat; a fifth for rye; a sixth for yield per acre, and an eighth for quantity, of wheat; thus obtaining an honourable position in six out of the seven—a position not attained by any State of the Union—while the great State of Illinois only obtains three first places and a second, and then disappears from the comparison altogether.

The Hon. D. A. Wells makes the following statement regarding Southern Ontario:—

“North of Lakes Erie and Ontario, east of Lake Huron, south of the forty-sixth parallel, and included within the Dominion of Canada, there is as fair a country as exists on the American continent—nearly as large in area as New York, Pennsylvania, and Ohio combined, and equal if not superior as a whole to those States in agricultural capacity. It is the natural habitat on this continent of the combing-wool sheep, without a full, cheap, and reliable supply of the wool of which species the great worsted manufacturing industries of the country cannot prosper, or, we should rather say, exist. It is the region where grows the finest barley, which the brewing interests of the United States must have if it ever expects to rival Great Britain in its present annual export of over eleven million dollars' worth of malt products. It raises and grazes the finest cattle, with qualities especially desirable to make good the deterioration of stock in other sections, and its climatic conditions, created by an almost encirclement of the Great Lakes, especially fit it to grow men.”

Ontario is the only province in the Dominion which supplies a definite course of technical instruction in agriculture, the Ontario Agricultural College, at Guelph, being the solitary institution of its kind in Canada. The college provides a general commercial and English education combined with technical training in agriculture. The building is commodious, well situated, and furnished with lecture-rooms, laboratories, museum, and sleeping apartments for the students. The college has been in operation for ten years, and is in a most flourishing condition. It is fortunate in having for its President Professor James Mills, M.A., who possesses a wide and comprehensive grasp of the principles which should guide the course of an institution of so much public importance, and whose untiring devotion to the objects for which the college was established is amply reflected in the support it receives from the people not only of Ontario but of other parts of the Dominion. The technical curriculum embraces all the subjects necessary to a right understanding of the theory and practice of agriculture.

Attached to the college is the Ontario Experimental Farm, which, under the management of Professor Brown, who so ably fills the Chair of Agriculture in the college, and who has worked arduously and successfully for the land of his adoption, has been productive of results of the highest value and importance to Canadian agriculture, and such as have amply justified the outlay which the Provincial Government incurs in the maintenance of the college and the farm.

As the technical instruction of intending farmers and colonists is a subject that seems to possess a perennial interest in England, I may here introduce a few observations on the outlay, actual or estimated, in State-supported institutions in Canada. The Manitoba Department of Agriculture, in discussing the desirability of establishing in the prairie province a School of Agriculture and an experimental farm, says in its report :

"It has been urged upon the Department that such an institution could easily be made self-supporting. The experience of the agricultural colleges in the United States does not justify this assumption, nor does the result in Ontario, where the expenditure on the School of Agriculture at Guelph, in 1881, was 8145*l.*, the total receipts being 3074*l.*, leaving a loss of 5071*l.*, without reckoning interest on the cost of the farm, and of the valuable buildings which have been erected on it. Were the public lands in the Province under the control of this Government, it might be practicable to take steps for the establishment of a school, but in the present position of the public domain, it may not be considered advisable to incur the requisite outlay. Under the provisions of the Dominion Lands Act of 1879, the Dominion Government is given power to grant land not exceeding in extent 960 acres to any person or persons who will establish and keep in operation

thereon for a term of not less than five years a school of instruction in practical farming and all matters pertaining thereto, adapted for thirty pupils, with the approval and to the satisfaction of the Minister of the Interior. In a scheme of this nature there is ample scope for private enterprise with a reasonable certainty of profit, as an institution of that nature could no doubt be conducted more economically under private management than under public control . . . Such a school, established on sound principles, might, if placed under the supervision of this Department, become entitled to some bonus or other aid from the Province, but further than this it does not seem practical at present to suggest. The public lands in the Province are being so rapidly taken up, that persons desirous of establishing a school should lose no time in making a start."

To the Select Agricultural Committee of the Dominion House of Commons appointed last year, Professor Brown presented the following estimates :—

**ESTIMATE of ANNUAL MAINTENANCE of an AGRICULTURAL COLLEGE and EXPERIMENTAL FARM.**

| THE AGRICULTURAL COLLEGE. |        |                                      |
|---------------------------|--------|--------------------------------------|
| <i>Dr.</i>                |        | <i>Cr.</i>                           |
|                           | £      | £                                    |
| Fees of 100 students,     |        |                                      |
| at £10 .. .. .            | £1,000 | Salaries of five teachers.. .. 1,300 |
| Students' board charge,   |        | Management of college .. .. 240      |
| at £15 .. .. .            | 1,500  | Boarding-house management .. 380     |
|                           | 2,500  | Boarding-house expenses .. 2,100     |
| Balance to debit .. ..    | 2,120  | General repairs .. .. 600            |
|                           | £4,620 | £4,620                               |

**THE EXPERIMENTAL FARM (400 Acres Cultivated).**

|                            | £      |                                       | £      |
|----------------------------|--------|---------------------------------------|--------|
| Revenue from sale of Live- |        | Salaries of three foremen } .. 420    |        |
| stock, Wool, Grain, &c ..  | 940    | teachers .. .. .                      | 288    |
|                            |        | Wages of four ploughmen ..            | 160    |
|                            |        | Wages of cattleman and shep- } .. 868 |        |
|                            |        | herd .. .. .                          |        |
|                            |        |                                       | 868    |
|                            |        | Special Manures, Seeds, Black-        |        |
|                            |        | smith, Harness, Fuel, Medi-           |        |
| Balance to debit .. ..     | 528    | cine, Printing, Implement             |        |
|                            | £1,468 | Repairs, &c. .. .. .                  | 600    |
|                            |        |                                       | £1,468 |

The actual revenue and expenditure of the Ontario Agricultural College for the year 1882, as detailed in the President's Report, is summarised in the following statement :—

## ONTARIO AGRICULTURAL COLLEGE, 1882.

| Dr.                        |        | Cr.                           |        |
|----------------------------|--------|-------------------------------|--------|
| INCOME.                    |        | EXPENDITURE.                  |        |
|                            | £      |                               | £      |
| Tuition fees .. .. .       | 734    | Salaries and wages .. ..      | 2,422  |
| Board .. .. .              | 987    | Food .. .. .                  | 1,952  |
| Supplemental Exam. fees .. | 6      | Household expenses .. ..      | 1,378  |
|                            |        | Advertising, Printing, &c. .. | 160    |
|                            |        | Laboratory, Library, &c. ..   | 222    |
| Balance to debit .. ..     | 4,549  | Water for college and farm .. | 142    |
|                            | £6,276 |                               | £6,276 |

Thus the maintenance of the college alone cost the Province 4549*l.* in 1882, while in 1883 a similar statement shows a deficiency of 5160*l.* to be provided by the Province, the corresponding sum in 1884 being 4506*l.* The students meet part of their expenses by the regular labour they perform on the farm,—3½ hours to 5 hours a day, and, in July and August, when there are no lectures, 9½ hours a day, at from 2*d.* to 5*d.* per hour, according to the value of the work as estimated by the farm superintendent or his foremen. Board, lodging, and light cost from 9*s.* to 10*s.* per week. The charges as thus reduced to a minimum are:—

1. "The entire cost to an Ontario farmer's son, able and willing, with considerable experience in farm work, is 10*l.* to 14*l.* a year for board, washing, and tuition.
2. "To an Ontario student without any previous knowledge of farming, 12*l.* to 15*l.* a year for board, washing, and tuition.
3. "To non-resident students (*i.e.* from outside Ontario), 15*l.* to 20*l.* a year for board, washing, and tuition."

The balance-sheet of the Experimental Farm does not appear in the annual report, but the following are the valuations of live-stock and implements on 31st December:—

|                    | 1883. | 1884. |
|--------------------|-------|-------|
|                    | £     | £     |
| Horses .. .. .     | 470   | 465   |
| Cattle .. .. .     | 1,000 | 6,296 |
| Sheep .. .. .      | 35    | 1,054 |
| Pigs .. .. .       | 130   | 108   |
| Implements .. .. . | 1,543 | 1,737 |
|                    | 3,178 | 9,660 |

The farm, comprising 550 acres, of which 400 are cleared, was purchased by the Provincial Government in 1873 for 15,000*l.* The total cost of land and buildings, furniture, live-

stock, implements, drainage, &c., to the end of 1880, amounted to 45,178*l*.

Did space permit, I should like to give a description of the two pleasant days I spent at this admirable institution under the courteous and instructive guidance of President Mills and Professor Brown, but I must content myself with a brief summary. The crops include wheat, barley, oats, peas, hay, roots, pasture, and green corn. I walked amongst a splendid field of Indian corn, ten or a dozen feet high, and just ready to cut for soiling. Besides the ordinary live-stock, the farm possesses high class pedigree representatives of ten breeds of cattle, and ten breeds of sheep, whose cost is included in the valuation for 1884. I have condensed into the Table on page 41 a summary of the cattle.

The sheep comprise: of Lincolns, one ram (30*l*.), and three ewes (10*l*. each), bred by Mr. R. Wright, Nocton Heath, Lincoln; Cotswolds, one ram (23*l*.), bred by Mr. R. Swanwick, Cirencester, one ram (30*l*.), bred by Messrs. Gillett, Kilkenny, Bampton, and five ewes (5*l*. each), bred by Messrs. Gillett; Leicesters, one ram (50*l*.), and six ewes (8*l*. 6*s*. 8*d*. each), bred by Mr. R. Wallace, Mauchlin, Ayrshire; Highland, one ram (10*l*.), and two ewes (2*l*. 10*s*. each), bred by Mr. J. Craig, Craigdarroch; Cheviots, one ram (10*l*.), and two ewes (2*l*. 10*s*. each), bred by Mr. W. Marshall, Merton Mains; Oxford Downs, two rams (20*l*. each), and six ewes (10*l*. each), bred by Mr. A. Brassey, Heythrop Park, Chipping Norton; Hampshire Downs, two rams (40*l*. and 35*l*.), and five ewes (6*l*. each), bred by Mr. W. Parsons, West Stratton, Micheldever; Shropshire Downs, two rams (65*l*. and 35*l*.), bred by Mr. J. Evans, Uffington, Shrewsbury, and one ram (10*l*.), and twenty ewes (5*l*. each), bred by Sir Henry Allsopp, Bart., Hindlip Hall, Worcestershire; Southdowns, two rams (52*l*. 10*s*. and 105*l*.), and five ewes (10*l*. 10*s*. each), bred by Lord Walsingham, Merton, Norfolk.

Merinos are to be added to the sheep, and Holsteins\* to the cattle; but no provision is being made for Welsh or Kerry cattle, as they are not considered suitable for Canada. For the students of the college this splendid array of live-stock will possess all the educational value of a permanent agricultural show, and it is a great treat to walk through the houses and see the representatives of so many aristocratic families at one and the same time. The beneficent effect which such sires as "Strathglass," "Conqueror," "Rob Roy," and "Sir Leonard," will produce in the Province, is bound to make itself apparent in a few years' time.

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\* These are really Dutch (chiefly Friesland) cattle.—EDIT.

| NAME.                                   | DATE OF BIRTH. | BREEDER.  | COST.   |
|---|----------------|---|---------|
| <b>SHORTHORNS,—</b>                     |                |   | £       |
| Sir Leonard, 45613 ..                   | Jan. 4, 1880   | Mr. Hugh Aylmer, West Dereham ..                        | 210     |
| Rob Roy, 45484 ..                       | June 23, 1880  | Mr. J. A. Gordon, Udale, N.B. ..                        | 450     |
| Mademoiselle ..                         | Jan. 13, 1878  | Mr. W. Duthie, Collynie, Aberdeenshire                  | 150     |
| Beta ..                                 | Sept. 9, 1879  | Mr. Hugh Aylmer, West Dereham ..                        | 210     |
| Baroness Wild Eyes                      | Nov. 20, 1880  | Mr. John Evans, Uffington, Shrewsbury                   | 31 10s. |
| Princess Royal ..                       | Jan. 22, 1882  | Mr. W. Duthie, Collynie, Aberdeenshire                  | 200     |
| <b>HEREFORDS,—</b>                      |                |   |         |
| Conqueror, 7510 ..                      | Apr. 25, 1882  | Mr. T. J. Carwardine, Stockton Bury                     | 500     |
| Bloomer ..                              | May 29, 1878   | Mr. J. Hill, Church Stretton ..                         | 105     |
| Sunflower ..                            | Dec. 3, 1881   | Her Majesty the Queen ..                                | 85      |
| Cronkhill Duchess 2nd                   | Mar. 8, 1882   | Mr. J. Hill, Church Stretton ..                         | 67      |
| <b>ABERDEEN-ANGUS</b>                   |                |   |         |
| <b>POLLS,—</b>                          |                |   |         |
| Strathglass, 2357 ..                    | Mar. 19, 1882  | Lord Tweedmouth, Guisachan, Inverness                   | 500     |
| Mavis 3rd of Mary-<br>park, 5285 ..     | Apr. 1879 ..   | Mr. J. Mackenzie, Lyne of Carron ..                     | 52 10s. |
| Kyma ..                                 | Mar. 11, 1880  | {Mr. J. Strath, Cauldhame, Tarves,}<br>Aberdeen ..      | 100     |
| Sybil's Darling 2nd,<br>4611 ..         | Mar. 27, 1880  | Mr. J. Argo, Cairdseat, Tarves ..                       | 50      |
| Minnie of Marypark,<br>5286 ..          | Apr. 1880 ..   | Earl of Seafield ..                                     | 70 7s.  |
| <b>DEVONS,—</b>                         |                |   |         |
| Rose's Duke ..                          | Apr. 7, 1883   | {Mr. W. Farthing, Stowey Court,<br>Bridgewater ..}      | 45      |
| Esmeralda, 4433 ..                      | 1877 ..        | Mr. W. Smith, Whimble, Devon ..                         | 60      |
| <b>GALLOWAYS,—</b>                      |                |   |         |
| Stanley 3rd of Drum-<br>lanrig, 1793 .. | Jan. 1, 1882   | Duke of Buccleuch ..                                    | 100     |
| Gem 2nd of Drum-<br>lanrig, 4236 ..     | Jan. 18, 1882  | Mr. J. Neilson, Kirkcubright, Dumfries                  | 60      |
| Berta of Drumlanrig,<br>4222 ..         | Feb. 27, 1882  | Duke of Buccleuch ..                                    | 60      |
| <b>AYRESHIRE,—</b>                      |                |   |         |
| Campbell of Drum-<br>lanrig, 462 ..     | Apr. 1882 ..   | Duke of Buccleuch ..                                    | 42      |
| Stately 3rd of Drum-<br>lanrig, 863 ..  | Apr. 22, 1879  | Do. ..  | 40      |
| Sensation 2nd of<br>Drumlanrig ..       | June, 14, 1881 | Do. ..  | 40      |
| Peggie of Auchenbrain                   | Mar. 1882 ..   | Mr. R. Wallace, Auchenbrain, Mauchlin                   | 25      |
| Jennie of Auchenbrain                   | Apr. 1882 ..   | Do. do.   | 25      |
| <b>GUERNSEYS,—</b>                      |                |   |         |
| Cetywayo, 37 ..                         | May 12, 1882   | Mr. J. Le Page, St. Saviour's, Guernsey                 | 50      |
| Ruth ..                                 | May, 1882 ..   | Mr. Ogier, St. Martin's, Guernsey ..                    | 35      |
| Goldleaf ..                             | Apr. 1881 ..   | {Mr. De Garris, Fortavale Parish,<br>Guernsey ..}       | ..      |
| <b>JERSEYS,—</b>                        |                |   |         |
| St. Mary's Boy, 535 ..                  | Feb. 10, 1883  | {Mr. E. P. Du Feu, St. Mary's Parish,<br>Jersey ..}     | 45      |
| Beauty of the Mill ..                   | May 8, 1882    | Mr. P. Le Couillard, Grouville, Jersey                  | 45      |
| Rosie ..                                | May 8, 1885    | Do. do.   | 45      |
| Le Tocq's Princess ..                   | May, 1882 ..   | Mr. J. H. Kent, St. Owen's, Jersey ..                   | 45      |
| <b>WEST HIGHLAND,—</b>                  |                |   |         |
| Duke of Argyle ..                       | Apr. 1881 ..   | {Presented by Mr. G. Whitfield, Rouge-<br>ment, Quebec. | ..      |

The experimental department of the farm provides for numerous cattle-feeding trials, investigations into the influence of food on dairy products, and a considerable variety of experimental field work, embracing the testing of different kinds of wheat, trials of fertilisers, thick and thin seeding, deep and shallow seeding, selection of grasses and clovers, establishment of permanent pasture, and rotations in cropping. The experimental plots are to be seen in a field of 24 acres divided into 180 plots of one-tenth acre each, and amongst the appliances are a rain gauge of one-thousandth of an acre area, six lysimeters, eight ground thermometers, the usual meteorological instruments, and a well-equipped analytical laboratory in the field. The plots are disposed in nine ranges. In the first the cropping is made up of cereals newly imported from England; the second is appropriated to testing nitrogen in three forms of combination, and in three ratios; the third, similarly testing phosphoric acid; the fourth, permanent pasture and turnips under three forms of manure; the fifth, green fodder crops and twenty varieties of grasses and clovers; the sixth, varieties of mangold with special fertilisers; the seventh is left blank; the eighth is devoted to trying peas from England; and the ninth to testing varieties of winter wheat and the suitability of trees.

Amongst so many inquiries, ensilage has not been overlooked. A common root cellar was, at an outlay of 5*l.* 10*s.*, properly cemented and converted into an air-tight silo in which green oats were stored. The silo was opened ninety days after its completion, and the fodder was found to be "one body of sweet, well-coloured, oat-stalks, leaves, and heads," possessing a temperature of about 70° Fahr. Twenty-eight tons of green oats were put in the silo, filling it to a depth of 10 feet; it was at once covered with 2-inch boards, 9 inches wide, and loaded with earth that gave a pressure of 1000 lbs. per square yard. The results of feeding this silage have not yet been published, but the following figures, which represent the full cost of filling the silo, may prove of interest; mowing, hauling, cutting, and packing were all accomplished within the space of three days:—

|  | £  | s. | d. |
|--|----|----|----|
| Wear and tear of engine .. .. .                            | 0  | 12 | 0  |
| Engine driver .. .. .                                      | 0  | 18 | 0  |
| Two teams hauling from field ( $\frac{1}{4}$ mile) .. .. . | 2  | 10 | 0  |
| Mower and team, one day .. .. .                            | 0  | 12 | 0  |
| Field loaders .. .. .                                      | 1  | 8  | 0  |
| Feeding straw-cutter, two men .. .. .                      | 1  | 4  | 0  |
| Men in silo, four .. .. .                                  | 2  | 0  | 0  |
| Carpenter .. .. .  | 0  | 8  | 0  |
| Total .. .. .  | £9 | 12 | 0  |



This represents an average cost of about 7s. per ton.\*

To give some idea of the painstaking care with which Professor Brown discharges the duties of his office, I reproduce, on pages 44 and 45, two Tables referring respectively to cattle and sheep. Though English breeders may not be disposed to agree with the decisions in every case, they will nevertheless study the tables with interest. I may mention that in the case of cattle the 1000 maximum points of the "beef and milk" breeds are not to be considered as equivalent to the 1000 points in the two other cases. And in the case of sheep I have added the last column, to show which breed is estimated to stand highest in the respective points. Arranged in order of general excellence as indicated by the total marks, the sheep stand thus:—1. Southdown. 2. Hampshire Down. 3. Shropshire Down. 4. Oxford Down. 5. Leicester. 6. Cotswold. 7. Lincoln. 8. Merino. 9. Cheviot. It is worth noticing that while the Hampshire Downs do not obtain the highest mark under any point, they yet stand second on the general list.

The cost of producing beef is illustrated in the particulars issued by the Ontario Experimental Farm in conjunction with an announcement of the sale by auction of seven prime young steers a few days before Christmas last. Their average age was 2 years 4½ months, and average weight 1660 lbs. The following is stated to be the cost of production per head, though it would probably have been more correct had the value of the manure been deducted instead of that of the home-grown food:—

|  | £     | s. | d. |
|--|-------|----|----|
| FIRST YEAR, including calf value, milk and all other food, with attendance .. .. . | 8     | 0  | 0  |
| SECOND YEAR, food and care .. .. .   | 11    | 13 | 0  |
| FOUR MONTHS OF THIRD YEAR .. .. .  | 4     | 3  | 8  |
|  | <hr/> |    |    |
|  | £23   | 16 | 8  |
| Less estimated market value of food grown on farm                                  | 8     | 13 | 8  |
|  | <hr/> |    |    |
| Total actual cost of production .. .. .  | £15   | 3  | 0  |

This brings the cost to close upon 2½d. per lb. live-weight. At an exportation price of 3d., there would be a cash profit of 5l. per head on these cattle, and nearly double this is sometimes realised for Canadian Christmas beef. The food in the foregoing case consisted of hay, roots, green fodder, bran, peas, corn, oats, oil-cake, and Thorley condiment, averaging during winter of second year, 9 lbs. hay, 25 lbs. roots, 8 lbs. grain, and 2 lbs. cake per day.

\* These figures may be compared with similar ones in the "Report on the Practice of Ensilage at Home and Abroad," by H. M. Jenkins, F.G.S., in this 'Journal,' Second series, vol. xx. 1884, p. 126 *et seq.*

## STANDING OF LEADING BREEDS OF CATTLE as recognised in ONTARIO in 1884.

| STANDARD POINTS OF CATTLE.    | Beef.          |            |           |                |           | Beef and Milk. |        |                            | Milk.          |        |           |         |
|-------------------------------|----------------|------------|-----------|----------------|-----------|----------------|--------|----------------------------|----------------|--------|-----------|---------|
|                               | Maximum Value. | Shorthorn. | Hireford. | Aberdeen Poll. | Galloway. | Maximum Value. | Devon. | Norfolk and Suffolk Polls. | Maximum Value. | Dutch. | Ayrshire. | Jersey. |
| 1. Early Maturity .. .. .     | 200            | 200        | 180       | 195            | 125       | 140            | 130    | 140                        | 75             | 75     | 60        | 55      |
| 2. Permanency of Character .. | 100            | 80         | 90        | 68             | 100       | 70             | 85     | 70                         | 70             | 63     | 65        | 70      |
| 3. Weight of Flesh .. .. .    | 150            | 150        | 134       | 143            | 110       | 100            | 85     | 100                        | 70             | 70     | 50        | 35      |
| 4. Constitution .. .. .       | 50             | 40         | 50        | 36             | 45        | 50             | 45     | 50                         | 50             | 50     | 43        | 30      |
| 5. Freedom from Disease ..    | 60             | 70         | 60        | 48             | 57        | 55             | 60     | 55                         | 60             | 60     | 50        | 57      |
| 6. Impressive Power .. .. .   | 40             | 40         | 35        | 35             | 53        | 40             | 40     | 25                         | 40             | 40     | 33        | 35      |
| 7. Reliable Breeder .. .. .   | 60             | 48         | 60        | 50             | 58        | 60             | 60     | 54                         | 60             | 60     | 55        | 56      |
| 8. Hardiness .. .. .          | 60             | 40         | 55        | 45             | 40        | 55             | 55     | 48                         | 50             | 45     | 50        | 30      |
| 9. Quality of Flesh .. .. .   | 30             | 18         | 22        | 24             | 30        | 20             | 20     | 25                         | 20             | 13     | 20        | 18      |
| 10. Forager .. .. .           | 40             | 27         | 37        | 50             | 40        | 40             | 40     | 37                         | 40             | 34     | 40        | 27      |
| 11. Disposition .. .. .       | 35             | 35         | 28        | 33             | 24        | 38             | 50     | 38                         | 25             | 55     | 48        | 60      |
| 12. Good Mothers .. .. .      | 25             | 20         | 25        | 21             | 23        | 25             | 25     | 20                         | 25             | 23     | 19        | 25      |
| 13. Least Offal .. .. .       | 20             | 17         | 20        | 18             | 20        | 15             | 13     | 15                         | 10             | 10     | 9         | 8       |
| 14. Quantity of Milk .. .. .  | 60             | 60         | 55        | 53             | 50        | 130            | 110    | 130                        | 200            | 200    | 185       | 100     |
| 15. Quantity of Milk .. .. .  | 25             | 20         | 20        | 22             | 20        | 65             | 65     | 50                         | 100            | 50     | 30        | 100     |
| 16. Cost of Production .. ..  | 45             | 42         | 45        | 44             | 36        | 40             | 35     | 40                         | 40             | 40     | 35        | 28      |
| 17. Long Use .. .. .          | ..             | ..         | ..        | ..             | ..        | 20             | 20     | 17                         | 30             | 30     | 25        | 20      |
|                               | 1040           | 892        | 916       | 865            | 832       | 1000           | 938    | 914                        | 1000           | 918    | 817       | 754     |

STANDING OF LEADING BREEDS OF SHEEP as recognised in ONTARIO in 1884.

| STANDARD POINTS OF SHEEP.        | Maximum Value. | Lincoln. | Cotswold. | Leicester. | Cheviot. | Oxford Down. | Hampshire Down. | Shropshire Down. | South-down. | Merino. | Hichest.     |
|----------------------------------|----------------|----------|-----------|------------|----------|--------------|-----------------|------------------|-------------|---------|--------------|
| 1. Early Maturity .. ..          | 200            | 150      | 140       | 200        | 100      | 180          | 170             | 170              | 180         | 70      | Leicester.   |
| 2. Weight of Fleece .. ..        | 150            | 150      | 140       | 130        | 60       | 135          | 130             | 125              | 80          | 100     | Lincoln.     |
| 3. Permanency of Character .. .. | 80             | 40       | 50        | 35         | 70       | 30           | 60              | 55               | 75          | 80      | Merino.      |
| 4. Quality of Wool .. ..         | 70             | 40       | 37        | 48         | 30       | 50           | 60              | 58               | 65          | 70      | Merino.      |
| 5. Weight of Flesh .. ..         | 50             | 50       | 45        | 40         | 28       | 38           | 35              | 33               | 25          | 20      | Lincoln.     |
| 6. Constitution .. ..            | 50             | 25       | 40        | 40         | 33       | 45           | 35              | 30               | 50          | 20      | Southdown.   |
| 7. Freedom from Disease .. ..    | 50             | 33       | 33        | 25         | 35       | 30           | 45              | 40               | 50          | 25      | Southdown.   |
| 8. Impressive Power .. ..        | 40             | 20       | 25        | 35         | 25       | 15           | 30              | 27               | 40          | 33      | Southdown.   |
| 9. Reliable Breeder .. ..        | 40             | 23       | 25        | 20         | 30       | 40           | 35              | 35               | 38          | 15      | Oxford Down. |
| 10. Hardiness .. ..              | 30             | 20       | 30        | 15         | 38       | 30           | 35              | 35               | 40          | 25      | Southdown.   |
| 11. Quality of Flesh .. ..       | 30             | 15       | 18        | 12         | 25       | 22           | 28              | 28               | 30          | 10      | Southdown.   |
| 12. Prolificness .. ..           | 30             | 18       | 20        | 15         | 15       | 30           | 25              | 25               | 28          | 10      | Oxford Down. |
| 13. Forager .. ..                | 30             | 15       | 18        | 10         | 30       | 20           | 23              | 23               | 25          | 25      | Cheviot.     |
| 14. Disposition .. ..            | 20             | 12       | 10        | 18         | 8        | 20           | 15              | 15               | 13          | 7       | Oxford Down. |
| 15. Good Mothers .. ..           | 20             | 12       | 12        | 7          | 10       | 18           | 15              | 15               | 20          | 7       | Southdown.   |
| 16. Least Offal .. ..            | 20             | 7        | 9         | 20         | 8        | 12           | 15              | 15               | 10          | 8       | Leicester.   |
| 17. Length of Wool .. ..         | 20             | 7        | 8         | 10         | 10       | 12           | 15              | 15               | 18          | 20      | Merino.      |
| 18. Uniform Fleece .. ..         | 40             | 30       | 28        | 20         | 20       | 25           | 35              | 33               | 35          | 40      | Merino.      |
| 19. Cost of Production .. ..     | 20             | 7        | 10        | 20         | 10       | 18           | 15              | 15               | 15          | 12      | Leicester.   |
| Total .. ..                      | 1000           | 674      | 698       | 715        | 585      | 770          | 821             | 792              | 837         | 597     | Total.       |

It is difficult to estimate the value of the good results that have emanated from the Ontario Agricultural College and Experimental Farm. Whatever these have been in the past, they are likely to be still greater in the future—in the years to come when the many students who have been trained at Guelph will have beneficially influenced the style and progress of farming throughout the length and breadth of the Dominion. The Ontario Government expends no money more advantageously than that which is applied to the maintenance of this useful and necessary institution.

#### THE PROVINCE OF QUEBEC.

Quebec, the oldest Province in Canada, extends for some hundreds of miles along both banks of the mighty St. Lawrence. Its northern boundary is the high land which constitutes the water-parting between the rivers flowing northwards into James Bay and Hudson's Bay, and those which flow southwards into the St. Lawrence. Its western boundary is determined mainly by the Ottawa River. Upon the south the Province is bounded by the parallel of 45° north latitude until it reaches New Hampshire, when, trending north-east, the boundary line follows a sinuous course till it terminates on the borders of New Brunswick. As the Atlantic steamers wend their way along the bosom of the majestic St. Lawrence, the traveller acquires a good idea not only of the immensity of this famous river, but also of the physical features of the Province of Quebec. On either bank he sees a broad alluvial plain clothed with forest trees down to the water's edge, except where extensive clearances have been made, and the background is effectively occupied by ranges of hills. Near the shores, and particularly on the south side, are to be seen the white houses of the old French settlers, sometimes aggregated into villages and towns, but more frequently dotted along in one straggling line for more than a hundred miles. Here and there the sombre hue of the woodlands is varied by the glittering spire of a Roman Catholic church, for the French Canadians have adhered to their faith, to their language, and it might almost be said to their farming. Of the 1,359,027 people who dwelt in the Province in 1881, no less than 1,073,820 were of French origin. More French is to be heard than English, and all the enactments of the Provincial Parliament, as well as all official notifications, appear side by side in French and English.

The Laurentian Mountains on the north, and the Adirondacks, Notre Dame, and Green Mountains on the south, are the most prominent features in the landscape. The valleys of

the Laurentians have been scooped out by innumerable streams which abound in fish, and their slopes are thickly covered with the timber which supplies the extensive lumbering trade of the Province, the value of the timber exports in 1883 having amounted to 2,105,990*l*.

The historic city of Quebec, the administrative capital of the Province, occupies a magnificent site, and has a population of 63,000. Montreal, the commercial capital, is 180 miles higher up the river, and has nearly 200,000 inhabitants. During winter the St. Lawrence is frozen over sufficiently to permit of traffic being carried on across it between the two sides of the river, and everybody has heard of the ice carnival at Montreal in February. "A visitor in winter is sure to be impressed with the weird scene in early morning or evening, when, from a sky as warm with rosy tints as in midsummer, the level beams of sunlight, glancing and brightening over the sea of quiet snowy furrows, and glittering icy crests, strike along the line of evergreens marking the ice roads, upon the trains of sleighs, and light up the tinned roofs and steeples of the distant city with brilliant splendour." And yet, such is the summer, that maize is a certain grain crop in nearly the whole of the Province. Spring wheat gives an average yield of about 10 bushels per acre, and, besides the ordinary crops of the farm, fruit is largely cultivated, especially in the south. Improved farms may be purchased at from 4*l*. to 6*l*. per acre, including dwelling-house, outbuildings, and fencing.

The following Tables are from the Census Returns of 1881:—

*Animals and their Products, Province of Quebec.*

|                               |           |
|-------------------------------|-----------|
| Horses .. .. .                | 225,006   |
| Colts and Fillies .. .. .     | 48,846    |
| Working Oxen .. .. .          | 49,237    |
| Milch Cows .. .. .            | 490,977   |
| Other Horned Cattle .. .. .   | 490,119   |
| Sheep .. .. .                 | 889,833   |
| Swine .. .. .                 | 329,199   |
| Cattle killed or sold .. .. . | 160,207   |
| Sheep .. .. .                 | 436,336   |
| Swine .. .. .                 | 333,159   |
| Pounds of Wool .. .. .        | 2,730,546 |
| Pounds of Hay .. .. .         | 559,024   |

As in the following figures the acreage is only given in one or two cases, I am unable to make up the average yields, but the numbers will serve to indicate the relative extent to which the various crops are cultivated:—

*Field Products, Province of Quebec.*

|                               | Bushels.   |
|-------------------------------|------------|
| Spring Wheat .. .. .          | 1,999,815  |
| Winter Wheat .. .. .          | 19,819     |
| Barley .. .. .                | 1,751,539  |
| Oats .. .. .                  | 19,990,205 |
| Rye .. .. .                   | 430,242    |
| Peas and Beans .. .. .        | 4,170,456  |
| Buckwheat .. .. .             | 2,041,670  |
| Indian Corn .. .. .           | 888,169    |
| Potatoes .. .. .              | 14,873,287 |
| Turnips .. .. .               | 1,572,476  |
| Other Roots .. .. .           | 2,050,904  |
| Grass and Clover Seed .. .. . | 119,306    |

And there were 1,614,906 tons of hay, the produce of 1,495,494 acres, the average being 1.08 tons per acre. As there were 224,678 acres in wheat, the yield shows the low average of 9 bushels per acre.

Farming in Quebec may be seen under two phases. There is the easy-going, comfortable, old-fashioned style of the French Canadians, very similar now, I imagine, to what it was a century ago; and there is the improved and progressive farming of the Eastern Townships. These comprise such towns as Richmond, Sherbrooke, Compton, and others in the south of the Province near the New England Boundary. They are mostly English, having been originally settled by the United Empire Loyalists, who left the United States at the time of their separation from England, making enormous sacrifices to preserve their allegiance. Besides Indian corn, tomatoes, grapes, and other delicate fruits are ripened in the open air. Grazing and stock-raising are, however, the special features in the farming of this area. The rich grasses of the hill-sides and the clear streams help to make it a good dairying country, and some of the best butter produced in the Dominion is made here, while the cheese is of excellent quality. Butter and cheese factories are largely on the increase in Quebec, no less than 400 new ones having been established in 1882. The Grand Trunk, Central Vermont, and other railways have opened up the townships for trade with Montreal and Quebec on the one side, and with the New England and New York States on the other, and these latter have taken great quantities of dairy produce in recent years. It is an admirable district for raising stock, as the celebrity of the Hon. M. H. Cochrane's pure-bred herds at Compton testifies. With their facilities for grazing cattle and sheep on their undulating lands, the farmers of the Eastern Townships are pushing their way to the front in order to secure

a share in the export cattle trade of the Dominion. The country is well wooded,—hard and soft maple, birch, elm, ash, basswood, butternut, hickory, cedar, and spruce being the chief trees.

Besides extensive beds of peat, the Province possesses immense deposits of apatite, in which a very large trade is growing up, the export from Montreal having reached 19,000 tons in 1883, and 20,000 tons in 1884, whereas in 1877 it did not amount to 6000 tons. The chief deposits are in Ottawa county, where, however, the mining of apatite was not commenced till 1875, since when the operations have steadily increased, and some of the phosphate lands have sold for as much as 250*l.* per acre. Raw Canadian phosphate will contain as much as 88 per cent. of tribasic phosphate of lime, and pure specimens of apatite contain about 92 per cent. Cargo samples analysed in England have yielded from 85 to 86 per cent. of tribasic phosphate, but the most usual average is from 75 to 80 per cent. Prices have fluctuated widely, ranging between 5*l.* 16*s.* and 3*l.* per ton of 80 per cent. quality. Low freights are sometimes obtained by ships taking apatite for ballast under timber cargoes, at from 2*s.* 6*d.* to 10*s.* per ton. As it is believed that much of the superphosphate exported from England to the United States,—7766 tons in 1883,—is worked up from raw phosphates imported from Canada, it is not unlikely that efforts will be made to establish manufactories in the Dominion, whose trade in phosphates with the States is very limited. It is worthy of note that the grain exported from Montreal in a single year has been estimated to contain 2574 tons of phosphoric acid, which implies the total exhaustion, so far as phosphates are concerned, of 75,000 acres of land, the renewal of which would necessitate the application of some 6000 tons of phosphate.\*

That there is room for improvement in the practice of the French Canadian farmers of Quebec may be gathered from the following evidence of Mr. G. Larocque, of Beaumont, Bellechasse County, before the Select Committee on Agriculture. "The land is too little worked over, the ploughing is too superficial, made in haste, often at unseasonable times. The harrowing leaves much to be desired—one often sees wooden harrows. The ditches and trenches are neglected. Noxious weeds appear in masses in many of the fields. In general, the stables are not sufficiently spacious or well lighted. The ventilation is faulty, and cleanliness is not the order of the day. But animals are better treated than in the past. Fresh manure

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\* *Vide* Report of the Minister of Agriculture for the Dominion of Canada for 1883.



is employed too much on the surface without being buried in the earth." Professor S. M. Barré says, "Too much grain growing is the trouble, and the number of cattle kept is not proportioned to the extent of land under cultivation. We should keep more cattle."

The quaint appearance of the "native" cattle of the Province of Quebec is sure to attract the notice of the agricultural visitor. They are of Transatlantic origin, their ancestors having been taken over by the French settlers when Canada was a part of the Dominions of France. Cattle similar to them may still be seen browsing on the plains of Brittany, whence the old French-Canadian colonists derived their supply. These Quebec cattle are good milkers, and a few of them may be found at nearly every one of the snug homesteads in the valley of the St. Lawrence.

The reckless felling of timber without making any provision for future requirements has led the Quebec Government to take up the question of preserving and re-planting forests, and of tree-planting along the high roads and farms. The result has been the institution of an "arbour-day," or annual tree-planting holiday. It is not that there is not plenty of timber, for the revenue from the Crown timber lands of Quebec amounted in 1883 to 171,375*l.*, but that in certain districts it is being so rapidly and so effectually removed, that in some municipalities the people have to send fifteen or eighteen miles for a load of wood. The revenue from the Crown lands in Ontario in 1883 was 127,090*l.*, but both in this Province and in Quebec an official conservation of woods and forests seems urgently needed.

#### THE MARITIME PROVINCES.

The Maritime Provinces are those of Prince Edward Island, New Brunswick, and Nova Scotia. The greater portion of their surface is still densely covered with timber, and their climate has less pronounced extremes of temperature than is the case in the more western Provinces. It is probably indicative of the rigid precautions the Canadians resort to in order to preserve their live-stock free from disease, that there is no quarantine station in the Maritime Provinces, all imported cattle from Europe having to enter by way of Quebec; the Nova Scotians are, however, hoping to get quarantine stations established at Halifax and Yarmouth.

*Prince Edward Island.*—This is the smallest Province in the Dominion, its area being about the same as that of our county of Norfolk. It lies in the Gulf of St. Lawrence, to the north of New Brunswick and Nova Scotia, being separated from the

mainland by Northumberland Straits. For a space of three months in the winter the presence of ice renders communication with the mainland difficult and uncertain. The climate is less foggy and less changeable than in the two other Maritime Provinces. The surface of the island is slightly rolling, and is covered by a bright red loam of uniform character and marked fertility. The land is nearly all cleared; there are few manufacturing on the island, and it has been called the garden of the Dominion, visitors flocking there in great numbers in summer.

The history of Prince Edward Island is instructive. Soon after the peace of 1763 it was divided into townships, and granted, by means of a lottery, to a number of persons, many of them officers of the army and navy who had served in the war. Conditions were attached to these grants, of quit-rent, of reservations for churches and wharves, and particularly of settlement. But most of the grantees had no intention of settling. Many sold their grants, and the lands of the island gradually fell into the hands of a few people who did nothing to improve them, but remained in England, waiting to profit by the labour of the actual settlers. Properly, these grants should have been cancelled for non-fulfilment of the conditions, but they were not; the fertility of the island attracted numbers of settlers, and it was soon very generally under cultivation; but as the leases ran out, the absent landlords raised the rents. Then arose numberless disturbances, the pioneers who had brought the wilderness under cultivation not being able to understand the correct principles of property and land tenure. Among these settlers were eight hundred Highlanders taken out by the Earl of Selkirk, and they soon became prosperous farmers. The land question continued to agitate the minds of the people for years, until, in 1860, the Government appointed a Commission which valued the rights of the absent proprietors, and recommended their purchase by the Government, with a view to re-selling to the tenantry; the British Government, however, disallowed a Bill for promoting this object. Shortly afterwards another Bill was passed and allowed, under which the Government acquired the proprietors' rights, and thus put an end to further agitation. The Government acquired 843,981 acres, and in 1882 only 142,011 acres remained not taken up. Of this area 67,000 acres was indifferent forest land, so that only 75,000 acres remained under lease to tenants who had not purchased. In this manner was Prince Edward Island converted into a country of proprietors from a country of tenant farmers.\*

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\* *Handbook of the Dominion of Canada, 1884.*

This Province has no Bureau of Agriculture, and the only legislation of agricultural interest has dealt with an Act to regulate the management of the Government Stock Farm, the Domestic Animals Act, 1878, and an Act to prevent the spread of the potato bug, 1883. There is a considerable export trade in horses, cattle, and sheep to other parts of Canada and to the New England States. Perhaps the most peculiar feature in the farming of the island is the extent to which the mussel-mud of the rivers is used as manure. The mud is obtained by a dredging machine, worked by horse-power, on the ice over the beds of nearly all the rivers where oyster and mussel deposits occur. These deposits are from ten to thirty feet thick, and are made up of oysters, mussels, decayed fish, and seaweed. Used as a fertiliser, this material acts promptly and effectively, and produces very large crops of hay. Improved farms can be bought here at about 4*l.* per acre.

*New Brunswick.*—The Province of New Brunswick is not much more than half as large as England. Its extreme length, north to south, is 230 miles, and its greatest breadth is 190 miles; but it has a coast line 500 miles long, and indented with spacious bays and inlets. The coast upon the Bay of Fundy is rocky and sterile, except at the head of the bay, where are the rich Acadian marsh or dyke lands, which are referred to at length under the head of Nova Scotia. Along the shores of the Gulf of St. Lawrence the coast is low and sandy. The surface of the Province is undulating, densely wooded, and nowhere marked by any considerable elevations, though low ranges of hills surrounded by fertile valleys and table-lands are not uncommon. Besides being a farming country, New Brunswick is noted for its lumber trade, its fisheries, and its ship-building industry. It was originally settled by the United Empire Loyalists, “the vanquished champions of a lost cause—the victims of a political idea which was unsuccessful,—and they turned to the wilderness and founded new communities, in which are now manifested the principles of rational liberty which were present in their minds. . . . Shipload after shipload of refugees landed on the rugged shore of the harbour of St. John. Many succumbed to the hardships of the first winter, with scanty shelter and scarceness of food, ‘With death swooping down o’er their failure, and all but their faith overthrown.’ But there their descendants remain to this day, the most vigorous, the most courageous and most indomitable of the people who inhabit the Dominion of Canada.” And yet, somehow, New Brunswick, notwithstanding its great natural advantages, its fine maritime position, its many noble rivers, its fertile soil, and its excellent system of railways, does not

seem to come to the front, and is less known in Britain than are most of the other Provinces. Perhaps the Provincial Government authorities are a little apathetic in the matter, or possibly they think it better to allow people to learn what they can for themselves, should their inquiries be opportunely turned in that direction.

Forty years ago the Province of New Brunswick was, by order of the British Government, explored by Major Robinson, R.E., who, in his report to the Imperial Parliament, said :—

“ Of the climate, soil, and capabilities of New Brunswick, it is impossible to speak too highly. There is not a country in the world so beautifully wooded and watered. An inspection of the map will show that there is scarcely a section of it without its streams, from the running brook to the navigable river. Two-thirds of its boundary are washed by the sea; the remainder is embraced by the large rivers the St. John and Restigouche. For beauty and richness of scenery this latter river and its branches are not to be surpassed by anything in Great Britain. The lakes of New Brunswick are numerous and most beautiful: its surface is undulating, hill and dale varying to the mountain and valley. The country can everywhere be penetrated by its streams.”

The Province has a Board of Agriculture, which takes charge of agricultural affairs and supervises the local societies. There are fifteen members—one from each county—and a secretary; the chairman must be a member of the Government. The office is at Fredericton, the administrative capital. Unfortunately there are no agricultural statistics made up, except the meagre returns by the secretaries of the agricultural societies. Reliable returns would be invaluable, but there appears to be an indisposition to supply the funds which would be necessary for the official collection of figures. The areas under cultivation as shown by the last four Census Returns were :—

|              | Acres.    |  |  |  |  |  |
|--------------|-----------|--|--|--|--|--|
| 1851 .. .. . | 643,954   |  |  |  |  |  |
| 1861 .. .. . | 885,108   |  |  |  |  |  |
| 1871 .. .. . | 1,171,157 |  |  |  |  |  |
| 1881 .. .. . | 1,253,299 |  |  |  |  |  |

But the acreage of improved land in 1881 was hardly more than one-tenth of the area capable of being profitably cultivated, and last year Mr. Julius L. Inches, Secretary to the Board of Agriculture, reported that not over 5 per cent. of the Province had been cleared of its timber.

I cannot discover the average yields of crops, but the following statement from the Census Returns shows the total yields in bushels in the years immediately preceding in each case :—

|                      | 1861.     | 1871.     | 1881.     |
|----------------------|-----------|-----------|-----------|
| Wheat .. .. .        | 279,775   | 203,592   | 521,956   |
| Barley .. .. .       | 94,679    | 70,547    | 84,183    |
| Oats .. .. .         | 2,656,883 | 3,044,134 | 3,297,534 |
| Rye .. .. .          | 57,504    | 23,792    | 18,268    |
| Peas and Beans .. .. | 30,677    | 45,056    | 43,121    |
| buckwheat .. .. .    | 904,321   | 1,231,091 | 1,587,223 |
| Indian Corn .. .. .  | 17,420    | 27,658    | 18,159    |
| Potatoes .. .. .     | 4,041,339 | 6,562,355 | 6,961,016 |
| Turnips .. .. .      | 634,364   | 603,721   | 990,336   |
| Other roots .. .. .  | 50,590    | 98,358    | 159,043   |
| Hay, tons .. .. .    | 324,166   | 344,793   | 414,046   |

From this it appears that barley and rye registered a decrease on the two decades. Indian corn was stationary, while there was a marked increase in wheat, buckwheat, and potatoes; the last-named are very successfully cultivated. As the Census Returns of 1881 state that there were 40,381 acres of wheat, 51,362 acres of potatoes, and 389,721 acres of hay, it follows that the average yields per acre of these three crops were: of wheat, 13 bushels; of potatoes, 135 bushels; and of hay, 1.06 tons.

The following is a similar statement, referring to the number of live-stock:—

|                        | 1861.   | 1871.   | 1881.   |
|------------------------|---------|---------|---------|
| Horses .. .. .         | 35,347  | 44,786  | 52,975  |
| Working Oxen .. .. .   | 19,111  | 11,132  | 8,812   |
| Milch Cows .. .. .     | 69,437  | 83,220  | 103,965 |
| Other Horned Cattle .. | 72,914  | 69,335  | 99,783  |
| Sheep .. .. .          | 214,092 | 234,418 | 221,163 |
| Swine .. .. .          | 73,995  | 65,805  | 53,687  |

The decrease in the number of working oxen and the concomitant increase in horses are evidences of improved methods of cultivation and of increasing prosperity amongst the farmers. The figures further indicate the increase in the dairy industry and in beef-growing. Though the quantity of ovine stock has remained almost stationary, the quality has much improved. The attention of the Government, as well as that of private breeders, has long been directed to the improvement of stock; and the establishment, in 1881, of the Government stock farm has been attended with good results. The native horned cattle of the Province originally came from New England and New York, and were of mixed breeds. Hardy, active, and generally

good milkers, they are not much adapted for the fattening process ; but the Shorthorn grades raised from these attain large size and weight at an early age, and make admirable stock for the butcher. The introduction of improved breeds has led to the raising of considerable numbers of cattle for the English market, and some of the farms in the counties of Albert and Westmoreland stall-feed as many as 200 or 300 head in a winter. There is a Provincial Herd Book, in which farmers are invited to record the pedigrees of all pure-bred animals they possess, and the majority find it decidedly advantageous to do so. The pure-bred stock in the Province are chiefly Shorthorns, Ayrshires, Devons, and Jerseys, with a small number of Polled Angus and Norfolks, and a few Herefords. Last year the herd on the Government stock farm comprised 9 Shorthorns, 6 Ayrshires, 5 Norfolk Polls, and 4 Aberdeen Polls, with some 15 or 16 young animals, and by its means the Government can supply farmers with fine animals at a less cost than by continuous importing. The site of the farm has, however, not proved suitable.

Some useful information as to the present position of agriculture in New Brunswick was collected by the Select Committee on Agriculture of the Dominion House of Commons. Mr. E. B. Beer, President of the New Brunswick Farmers' Association, stated that there is a want of capital and experience, and that, as the surplus produce of New Brunswick has not been much in excess of the home demand, farmers have not seen the necessity of raising a better quality of produce. Mr. J. L. Inches considers that their agriculture does not suffer under any peculiar difficulties, except a rather low condition of farming. A fair proportion of farmers have adopted an advanced system, and use suitable implements, but the larger number do not. The heavy duty on shipments to the United States is felt, for this is almost the only external market there is for the agricultural produce of New Brunswick. Mr. S. L. Peters, of Otnabog, Queen's County, says their farmers require a more thorough knowledge of the kinds of crops best suited to the various soils, and of the most economical method of making them more productive. The scarcity of cheap labour is largely felt. "In the production of butter the great want appears to be the reluctance on the part of our farmers and dairymen to supply themselves with the most approved implements with which they can convert their milk into butter. By far the larger portion of them seem willing to stick to the shallow-pan system of their fathers. This might answer a portion of the year, but is ruinous for the other part of the season. With the deep can, or creamer, as it is called, in use in our dairies the first step in

making a good article of butter is secured. With these cans submerged in cold spring or ice water there is no difficulty in securing all the cream from the milk in twelve hours, either in dog days or any other time. With a good article of cream there should be no difficulty in producing a first-class article of butter which will command the highest price. The cheese of the Dominion will command a good price in any market." Small dairies and imperfect arrangements prevail at present. The fertilisers in use are barnyard-manure, superphosphates, fish, pumice, gypsum, and great quantities of mussel-mud from the shores of the Bay of Fundy and of the Gulf of St. Lawrence.

The late Professor J. F. W. Johnston, F.R.S., in a report he made some years ago on the Province of New Brunswick, arrived at the following conclusions:—

"1. That the soil of New Brunswick is capable of producing food for a population of from five to six millions.

"2. That in the capability of growing all the common crops on which man and beast mainly depend, the whole Province of New Brunswick, taken together, exceeds even the favoured Genesee Valley.

"3. That the climate is an exceedingly healthy one, and that it does not prevent the soil from producing crops, which, other things being equal, are not inferior, either in quantity or quality, to those of average soils of England."

The dyke lands of New Brunswick and Nova Scotia, and the intervale lands of the former Province, are peculiar and interesting features. The dyke lands are described under the head of Nova Scotia, and as regards the intervale lands I cannot do better than quote the words of my colleague, Professor J. P. Sheldon, who is well acquainted with the districts in which they occur:—

"The 'intervale lands' of New Brunswick are, as the name suggests, found in the valleys. The name is peculiarly appropriate and expressive. In England we should call them bottom-lands, or alluvial soils. They are, in fact, alluvial soils to all intents and purposes, with this peculiarity—they are still in process of formation. In some cases these intervale lands consist of islands in the rivers—and there are many such in the magnificent river St. John; but for the most part they are level banks on each side of the river, in some cases several miles wide, and reaching to the foot of the hills, which form the natural ramparts of the valleys they enclose. These intervale lands are rich in quality, and the grass they produce is very good. Like the dyke-lands, they need no manuring artificially. The dyke-lands, in fact, have such a deep excellent deposit of unusual richness, that manuring is superfluous; but the intervale lands receive a periodical manuring in the deposit which is laid on them each spring by the freshets of the rivers. They are, in fact, flooded more or less for several weeks in the spring of the year, and the deposit left by the receding waters is of a character to add fertility to an already rich soil, and, at the same time, to add to its depth. An inch or two of rich alluvial mud deposited on these lands each year is gradually raising them above the influence of the freshets; and they are to-day among the most valuable soils in the Province."



Considerable portions of the area of New Brunswick are, no doubt, destined to remain clothed with forest, being unfitted for profitable cultivation otherwise. This, at least, seems to be the inference deducible from the 'Report on Northern and Eastern New Brunswick and North Side of the Bay of Chaleurs,' by Mr. R. W. Ells, in which the following words occur:—\*

"In all our explorations careful attention has been paid to the character of the soil in different localities. And it may be stated that in New Brunswick the finest soils are, as a rule, found on the Silurian or on the lower members of the Carboniferous systems. The rich and fertile districts of Carleton and Victoria counties may be cited as belonging to the Silurian system, while the beautiful valley of Sussex and the fine lands of King's and Albert counties result from the wear of strata which belong to the Lower Carboniferous formation. The soils formed from the Pre-Cambrian rocks, on the other hand, are generally hard, dry, and stony, while the Middle Carboniferous (especially its grey sandstones), gives rise to a soil which is too light and sandy to be of much fertility, and which, when once exhausted, is with great difficulty restored to good condition. Some portions of the Middle Carboniferous, however, consisting of purplish and reddish shales and sandstones, produce a soil of much greater strength and tenacity, often a stiff clay. This soil requires the addition of lime to make it easily and profitably worked. The Silurian soils, as a rule, contain in themselves sufficient lime; they are easily worked, and their fertility is very slowly exhausted. A knowledge of the distribution of the formation referred to may, therefore, prove of the greatest practical value to the immigrant and intending settler.

"It is to be regretted that, for agricultural purposes, so large a portion of the Province should be occupied by the grey and sandy portion of the Carboniferous system, and by granite and Pre-Cambrian crystalline rocks. In such districts the principal areas fit for agriculture are along the 'intervalles' or alluvial flats of the numerous streams, many of which are still uncultivated."

*Nova Scotia*.—"The marvellous country! The home of Evangeline, where Blomidon looks down on the tides of Fundy, and over tracts of red soil richer than the Weald of Kent." Thus speaks the Marquis of Lorne of Nova Scotia, the peninsular Province of the Dominion. It is connected with New Brunswick by an isthmus about 16 miles wide, and is 275 miles long by 100 miles wide at its greatest breadth. The island of Cape Breton, lying to the north of the peninsula, is 110 miles long by 80 broad, and is politically included in Nova Scotia, the area of the entire Province as thus constituted being about two-fifths of that of England. A line of water-parting extends lengthwise through the middle of the peninsula, most of the land on the eastern or Atlantic side of which is underlaid by hard Cambrian rocks that do not weather into very useful soils, they being hard, dry, and stony. The western half is composed of Silurian and Carboniferous strata, which disintegrate into a much better soil, the land in the south-west, along the Annapolis

\* 'Geological and Natural History Survey of Canada: Reports of Progress for 1880-81-82.' Montreal. Published by authority.

valley, and around the Basin of Minas, possessing remarkable fertility.

This fertility, however, is not entirely of local origin, for much of the soil along the Bay of Fundy consists of rich marine alluvium. The configuration of this bay is such that it presents southwards to the open ocean two coast-lines, those of Nova Scotia and the mainland, receding from each other at an acute angle, consequently when the north-flowing tidal wave enters the bay it finds its lateral extension gradually contracted and so its waters get piled up. "Where the undulation meets with the resistance of converging masses of land and a shallowing bottom, it is heaped up, sometimes, as in the Bay of Fundy, to a height of seventy feet, and rushes along as a great wave or as a surging and foaming ocean-river." \* Farmers along the lower reaches of the Severn valley in Gloucestershire will be familiar with a similar phenomenon, which there, however, only occurs with the high spring-tides, and produces the "bore." The tides of the Bay of Fundy spread themselves out over the adjacent coast-lands and have there deposited marsh soils of inexhaustible richness. In some of these saline swamps marsh-grass grows abundantly and yields a heavy crop. But large areas of the salt marshes have been reclaimed by means of mud dykes, so built as to prevent the irruption of the tidal water, and it is these dyke-lands which constitute so interesting and so peculiar a feature in Nova Scotia, along the Bay of Fundy, around the Basin of Minas, and on the adjacent shores of New Brunswick. The earthen dykes are strong and broad, six to eight feet high, and the land within them is firm and dry, and produces a great abundance of coarse but nutritious herbage. Some of this, which I examined on the salt marshes near Londonderry, I found to consist of cord-grass, *Spartina gracilis*, couch grass, *Triticum repens*, and one or two species of leguminous herbage. Year after year will these reclaimed marsh-lands give upwards of two tons of hay per acre and show no signs of running out, though they may become weedy. Should this happen, it is the practice to plough up portions at a time, at intervals of ten years or so, and to take a crop of wheat or oats, with which new grass seeds are sown. The salt hay, as it is termed, costs about 1*l.* per acre to make, and is worth from 5*l.* to 6*l.* per ton in the market. Most of the upland farms have some of these useful bottom dyke lands attached, and it is estimated that the latter extend over an area of some 70,000 acres. The cost of reclaiming and dyking these salt marshes varies between 1*l.* 10*s.* and 4*l.* per acre. The system of culti-

\* Archibald Geikie, 'Phys. Geogr.,' p. 152.

vation involves surface draining by cutting ditches 22 yards apart, 3 feet wide at the top, 2 feet 9 inches deep, and sloping to a width of 1 foot at the bottom. Three or four years subsequently the land is ploughed in ridges of 6 to 8 feet wide, sown with oats, and seeded down with timothy grass and clovers.

On the marsh lands that have not been dyked the grass is cut and drawn on to the higher slopes to cure, and is stacked on rude platforms which, supported by piles, stand several feet above high-water mark, so that when the tide is in they look like so many hay-laden rafts. Each platform, of which sometimes as many as a hundred may be counted from one spot, carries a ton or more of hay, which is carted into the farmyard as required in winter, and there used in conjunction with ordinary hay, straw, and roots.

Ordinary dyke lands sell for from 10*l.* to 30*l.* per acre, but I saw some very excellent ones in the Cornwallis valley which had been sold at from 40*l.* to 80*l.* In the fertile country around Grand Pré there is rich meadow-land, much of it worth 50*l.* to 75*l.* an acre.

Longfellow has left us a very graphic picture of this, the classic land of *Evangeline*:—

“In the Acadian land, on the shores of the Basin of Minas,  
Distant, secluded, still, the little village of Grand Pré  
Lay in the fruitful valley. Vast meadows stretched to the eastward,  
Giving the village its name, and pasture to flocks without number.  
Dykes, that the hands of the farmers had raised with labour incessant,  
Shut out the turbulent tides, but at certain seasons the flood-gates  
Opened, and welcomed the sea to wander at will o’er the meadows.  
West and south there were fields of flax, and orchards, and cornfields  
Spreading afar and unfenced o’er the plain, and away to the northward  
Blomidon rose.”

Arriving at Grand Pré on a glorious autumn morning, I realised the wondrous fidelity of this description.

Of the 11,000,000 acres of land in Nova Scotia about one-half are regarded as fit for cultivation, but unfortunately I have not been able to acquire much recent statistical information of agricultural interest. The Province has no Department of Agriculture, though there is a somewhat irresponsible Board of Agriculture to which the Provincial authorities seem content to relegate any subjects affecting the farming industries. The last report of the Board stated that there were ninety-two agricultural societies in the Province, embracing 5064 members, that the subscriptions amounted to 1307*l.*, and the Government grant to 1367*l.* Nearly all the societies reported some action for the improvement of stock.

Between 1860 and 1870 the weevil was so destructive to the wheat crops that the cultivation of wheat was almost abandoned ; but with greater care and better method it has since been resumed, and the total yield increased from 300,000 bushels in



*Cape Blomidon.*

(From the Marquis of Lorne's 'Canadian Pictures'.)

1851 to 530,000 bushels in 1881, potatoes in the same time from 2,000,000 bushels to 7,500,000 bushels, and hay from 300,000 tons to 600,000 tons.

The following figures are from the Census Returns of 1881:—

*Land.*

|                                | Acres.    |
|--------------------------------|-----------|
| Occupied .. .. .               | 5,396,382 |
| Improved .. .. .               | 1,880,644 |
| Under Crop and Pasture .. .. . | 1,859,020 |
| Orchards and Gardens .. .. .   | 21,624    |

*Number of Live Stock.*

|                             |                |
|-----------------------------|----------------|
| Horses .. .. .              | 46,044         |
| Colts .. .. .               | 11,123         |
| Working Oxen .. .. .        | 33,275         |
| Milch Cows .. .. .          | 137,639        |
| Other Horned Cattle .. .. . | 154,689        |
| Sheep .. .. .               | 337,801        |
| Swine .. .. .               | 47,256         |
| Wool sold .. .. .           | 1,142,440 lbs. |

*Field Products.*

|                        | Bushels.      |
|------------------------|---------------|
| Wheat .. .. .          | 529,257       |
| Barley .. .. .         | 228,748       |
| Oats .. .. .           | 1,873,113     |
| Peas and Beans .. .. . | 37,220        |
| Buckwheat .. .. .      | 339,718       |
| Indian Corn .. .. .    | 13,532        |
| Potatoes .. .. .       | 7,378,387     |
| Turnips .. .. .        | 1,006,711     |
| Other Roots .. .. .    | 326,143       |
| Clover Seed .. .. .    | 8,128         |
| Rye .. .. .            | 47,567        |
| Hay .. .. .            | 597,731 tons. |

The average yields of crops in the western counties are, in bushels per acre :—

|                   |     |
|-------------------|-----|
| Wheat .. .. .     | 18  |
| Barley .. .. .    | 35  |
| Oats .. .. .      | 34  |
| Rye .. .. .       | 21  |
| Maize .. .. .     | 42  |
| Buckwheat .. .. . | 33  |
| Beans .. .. .     | 22  |
| Turnips .. .. .   | 420 |
| Potatoes .. .. .  | 250 |
| Mangolds .. .. .  | 500 |

The average yield of hay is 2 tons, but as much as 4 tons per acre of timothy grass and clover have been secured in some districts, and followed by a fair aftermath. The Canadian ton, it must be remembered, is only 2000 lbs. In Hants and King's counties, and in the counties of Annapolis and Cumberland, enormous yields of cultivated grass and of salt grass have been taken off the dyke lands and marshes.

Nova Scotia is pre-eminently a grazing country; and though

the agricultural societies have effected some good, there is still much room for improvement in the quality of live-stock, both of sheep and cattle. As will be seen from the Census Returns of 1881, there were owned in Nova Scotia that year 300,000 cattle and 400,000 sheep, of which 63,000 cattle and 151,000 sheep were sold for consumption. The nearness to the seaboard gives to the stock farmers of Nova Scotia an enormous advantage over their brethren in Ontario and farther west, in so far as the export cattle trade is concerned. In all parts of the Province they are within one or two days' journey of Halifax, the port of shipment; there is no wearisome overland travelling for the cattle, with its lowering of condition and waste of tissue, for the animals can be on board the steamer the day after leaving the farm, and Halifax is nearer than Montreal to Liverpool by 200 miles. The climate of Nova Scotia is more an insular than a continental one, and this is an advantage to a grazing country. Sheep in the south-west remain out all through the winter, the coldest period of which is usually in March, when the east winds blow off the ice floes in the Atlantic. The port of Halifax is open all the year round, and the Allan steamers run there from Liverpool weekly through the winter; the navigation of the St. Lawrence is closed from November to April.

The trade of Nova Scotia has practically doubled during the last twenty years, and the annual imports now represent 2,400,000*l.*, and the exports 1,800,000*l.* In 1883, the agricultural export was valued at 300,000*l.*, and included cattle sent to Europe; potatoes, for which the Province is noted, exported to the United States; and enormous quantities of apples shipped at Annapolis.

The fruit-growing industry of Nova Scotia deserves more than a passing word. Thirty years ago the Province imported apples, and now the annual shipment to Europe approaches half-a-million barrels of three bushels each, and they are worth in the English market from 20*s.* to 24*s.* per barrel. The Annapolis valley is one of the finest apple-growing regions in the world, its fertile soil and sheltered position admirably fitting it to this industry. I may here reproduce a few figures which I collected while driving through the orchard districts around Port Williams. An orchard of six acres was pointed out to me which would yield 1000 barrels of apples, and they would sell for 500*l.* Gathering and packing would cost 5*d.* per barrel, and 10 barrels might be filled by one person in a fair day's work. The barrels can be bought at from 10*d.* to 1*s.* each. Young apple-trees, fit for transplanting, cost from 1*s.* 3*d.* to 1*s.* 8*d.* each, and to plant one acre with trees at the rate of 40 to the acre involves an out-

lay of from 5/ to 6/, which includes the cost of both labour and trees. Labourers' wages in the neighbourhood are from 25s. to 32s. per week during the busy season, and from 15s. to 17s. in winter, and the cost of living is less than in England.

I had the pleasure of travelling for some weeks in the company of Major-General Laurie, of Oakfield, Halifax, N.S., and desire to thank him for much enlightenment and information on many important matters. Although a Crimean veteran, the gallant gentleman is full of energy and vigour; he commands the Provincial militia, is president of the Board of Agriculture, has been farming for close upon twenty years in the Province, and is always to the front in any matter likely to have a favourable influence upon the development of agriculture in Nova Scotia. He has taken the lead in giving ensilage a trial, he is unwearied in his efforts to induce the Government authorities to establish an agricultural college and experimental farm, and he is now on the look-out for a winter oat suited to Nova Scotia, and I should be glad if some of our English seedsmen would make a note of this. His evidence before the Dominion Select Committee on Agriculture is valuable and interesting. He considers the Nova Scotian farmers labour under a great disadvantage in that they have had no agricultural education, so that many of them have no idea of what their land is capable of doing, or how to obtain the best return for their labour and outlay. Fruit-growers have bestowed much attention on their art and with exceedingly good results, but excepting these, and the few intelligent men who, under favourable conditions, are reclaiming marsh land with considerable profit to themselves, the vast majority of the farmers simply gain a subsistence, hence when money is in any way acquired, it is invested in anything rather than farming. Although there are five degree-conferring colleges in Nova Scotia, there is no provision for technical instruction in agriculture; and the suggestion, that one of these colleges should take up agriculture, is met by the objection, from all who have inquired into the subject, that agricultural faculties attached to arts colleges have invariably proved failures.

With regard to the dairy industry, some cheese-factories have been established in the Province, but there is no butter-factory. Recently the people of Colchester have embarked in a large milk-condensing business, which has so absorbed the milk of the district that some of the cheese-factories are paralysed. About 8 tons of milk per day are handled in this business, and all that cannot be profitably condensed is made into cheese. There is a more certain and continuous market for condensed milk than for cheese, and, besides, the former will keep better. The shareholders in the condensed-milk factory are largely



identical with those of a company which was engaged in factory cheese-making; but the latter business has been suspended for a time, and meanwhile the condensed-milk concern has made a good start by paying 8 per cent. as its first dividend. In Cape Breton there are some meat-canning establishments in operation; and in the Annapolis valley an industry is opening up in the canning of fruit, green corn, and tomatoes.

As to his own experience, I cannot do better than let General Laurie speak for himself:—

“A question naturally arises, whether the soil and climate of Nova Scotia are as favourable to the production of crops as other competing regions, and to this I must bring the testimony of eighteen years' personal experience in farming, on a new farm and therefore not under the most favourable conditions. Cattle live out at pasture from 1st June to 15th October, and thrive well during that time, and will hold their own for a month longer, if sheltered at night. All kinds of grain grow well. Oats and wheats are usually about 100 days from seed time to harvest. Last year 25 acres of spring wheat yielded me 25 bushels to the acre. Barley gives about 40 bushels to the acre; oats about 45, but there is a tendency to lodge when the crop is heavy. Potatoes have usually given me about 275 bushels to the acre, and swedes from 550 to 800, according to the season, and exposure of the field; if facing south or west, giving the smaller crop on account of the beat, and if north or east, the larger; thus showing that we are near the southern limits of turnip growing, as they do best in the cooler places. This has led me to turn my attention to growing Indian corn for ensilage, on which I can only consider I am experimenting; but last season, I cut (weighing sample carts as I hauled home) 20 tons per acre on a field of 15 acres. It seems admirably suited to the climate as a plant, and the mode of preservation is economical and the food appears valuable. Hay, the too-favourite crop of our farmers, averages (weight calculated when taken for feed and not when hauled off the field)  $1\frac{1}{2}$  tons to the acre on the upland fields. On 170 acres of cultivated land, in addition to keeping ten horses, and about the same number of cows, the year round, I raise sufficient food, with the addition of some purchased oilcake, which can be paid for by the sale of other surplus crops, to feed for the butcher 100 head of store cattle yearly. Permanent grass is practically unknown as, owing to the damp spring and autumn, it becomes overgrown with moss. Our most prosperous farming districts are those near tide water, where the flats have been dyked and the flow of the tide barred. On these, hay yields  $2\frac{1}{2}$  to 3 tons to the acre without impoverishment, and the after pasture is magnificent; and as the upland in these districts is usually light, the manure furnished from the dyke-land hay enables repeated crops of potatoes to be raised for sale, so that cattle and crops can both be sent to market.”

I do not think any one can travel much about Nova Scotia without noticing one very obvious reason why its agriculture is not in a more flourishing condition, namely, that the farming industry is hard pressed by three others, for each of which the Province is widely and deservedly noted. These are mining, fishing, and shipbuilding. There is an abundance of coal and iron in the Province, gypsum is largely quarried, and gold is worked at about twenty places. But the maritime industries are the chief attraction, and if there are fish to be

caught, or ships to be built, the farms may look after themselves. Imagine my surprise when, one day at a farm near London-derry, I was walking through the farmyard to get to the big barn that I might handle the salt hay which was being brought in, and a sudden turn brought me alongside a nearly completed, good-sized, sea-going vessel! There she was, at the end of the farmyard, resting high and dry upon the slips, which were directed downwards to a narrow channel filled just then with the fertilising red slime which may always be seen when the tide is out. No doubt she has been launched long ere this; the obliging tide would fill the channel, the wedges would be knocked away, and in a moment the farmers would see their good ship floating on the shore waters of the Bay of Fundy, whence she would be towed away for the completion of her equipment. Then, I presume, our friends would turn their attention to the farm till they got another ship on the stocks, or perchance till the mackerel or shad should strike in along the shore, when the farm would be forsaken for the boat and net.

In my Report to the Department of Agriculture of the Dominion Government there occur the following words, and I reproduce them, merely observing that most of the points alluded to are equally applicable to the other older Provinces as to the one now under notice:—

"Nova Scotia is in need of farmers who will give farming the first place in their consideration, who can bring with them some of the improved practices of modern agriculture, who can intelligently combine pastoral with arable farming, who know something of dairying, who understand how to manage and at the same time to improve a flock of sheep, who in laying land down to grass will not rest their faith solely in timothy, and who in estimating the yields of their root crops will discard the bushel measure in favour of the weighing machine."

There can be no doubt, then, that Nova Scotia offers good opportunities to farmers with some experience, and of all the provinces of the Dominion this is perhaps the most English-like in general character. In arable and stock-farming, in particular, the application of approved modern practice would soon tell its tale, and the exceptional facilities the Province enjoys with respect to the export trade should be a strong incentive to the speedier development of its agricultural resources. My observations with regard to the defects of Nova Scotian farming must not, however, be read without some modification; and it is but fair to state that I did see farms on which it would be very difficult either to find fault or to suggest improvements. Around the town of Windsor, where, through the kindness of the Sheriff, I took a long circular drive, I saw a splendid and picturesque farming country, with plenty of live-stock, and numbers of com-

fortable-looking farmhouses, the whole forming a picture which might be equalled but not often excelled in England. Near the flourishing town of Truro, again, some excellent farming may be seen. In Nova Scotia, as in the more western Provinces, the instinct for pioneer farming has a strong hold upon the people, and hence there are numbers of good farms for sale on account of their former occupiers having moved westward, or having perhaps embarked in other of the local industries to which reference has been made. Several tidy farmsteads were pointed out to me which, land and buildings together, might be bought for sums varying from 160*l.* to 200*l.*, according to the degree of cultivation. Improved farms of 100 to 150 acres, with house and buildings, are to be purchased at from 100*l.* to 500*l.* Uncleared Crown lands are offered by the Government at 8*l.* 16*s.* per 100 acres or less, so that 20 acres would cost as much as 100. Any quantity over 100 acres can be paid for at the rate of 1*s.* 10*d.* per acre.

I cannot conclude my brief notice of this charming Province without expressing my thanks to His Honour the Lieutenant-Governor of Nova Scotia, to the Mayor of Halifax, and other gentlemen, for their kindness and hospitality, which had the effect of making my visit as pleasant as it was instructive.

#### THE SELECT COMMITTEE ON AGRICULTURE.

The Dominion House of Commons last year appointed a Select Committee to inquire into the best means of encouraging and developing the agricultural interests of Canada. For this purpose the Committee took the evidence of persons who had made special study of the various branches of industry comprised under the more general term of Agriculture, of others possessed of wide scientific knowledge having a direct and important bearing upon agriculture, and of others again, who, being practical Canadian farmers, were well qualified to express the general feeling as to the wants and disadvantages experienced by agriculturists in Canada. The Committee further sent out a series of questions to agriculturists in all parts of the Dominion; these questions are too numerous to reproduce here, but it is worth noting, that the subject which, perhaps more than any other, has for the last year or so been prominently before the agricultural public in England is not in any way referred to, — that, namely, of ensilage. The leading subjects in the answers to the questions, as well as in the oral evidence, relate to deficiencies in the cultivation of cereals, roots, and grasses; in stock-raising and wool-growing; in dairy products, fruit culture, and fertilizers; to the importation of seeds, fruit-tree scions,

and plants, from countries under climatic conditions similar to those of Canada; the establishment of an experimental farm, and of a central bureau of agriculture, with a section devoted specially to statistics, recording the acreage under crop, movements and prices of produce, rates of transportation, and conditions of foreign markets, with the publication of such information by the frequent issue of bulletins and abstracts, and the dissemination of instruction on the various branches of agriculture through the medium of handbooks and reports; the ravages of birds and insects, and the appointment of an entomologist.

An examination of the replies sustains the view that more thorough agricultural knowledge, particularly of the kinds of crops most suitable to the various soils, and of the most economical and efficient methods of production, is the want that is most keenly felt. Notwithstanding the great progress made in recent years, there is still a large amount of defective farming. In the cultivation of cereals, roots, and grasses the chief drawbacks are want of periodical change of seed and its right selection, the absence of judicious rotations of crops, and a lack of thorough tillage and of knowledge of the value and suitability of manures. Much fertilising power is lost through negligent exposure of farmyard-manure and the waste of the liquid manure. In stock-raising there is a deficiency of pure-bred males, and a want of knowledge of the adaptability of breeds to particular conditions, while better pastures and more tree-shelter are needed. In fruit-culture, there is experienced a want of hardier varieties, and of varieties with improved keeping qualities. There is wide-spread and deplorable ignorance regarding the insects and diseases to whose attacks fruit-trees are so liable. As to the defects in the dairy industry, I have dwelt upon these in another section of this paper.

The following Table is interesting, as showing the prevalent feeling amongst Canadian farmers with reference to the subjects mentioned. It shows the numbers of those who approved and of those who disapproved each of the propositions named:—

|  | For. | Against |
|--|------|---------|
| Establishment of Experimental Farm ..      | 278  | 64      |
| Appointment of Entomologist .. ..          | 198  | 117     |
| Establishment of Central Bureau .. ..      | 256  | 62      |
| Section devoted to Statistics .. ..        | 211  | 74      |
| Handbooks, Reports, and issue of Bulletins | 255  | 48      |

Thus there was a majority in favour in every case all over the Dominion, and there was, moreover, a majority, in every case, in every Province.

*Cultivation of Beet.*—Several reliable authorities are of opinion that the beet-root sugar industry is as capable of successful prosecution in Canada as in Central Russia, and it is even maintained that the cultivation of the sugar-beet in Quebec would prove as beneficial to that Province as it did to France. I would, however, venture to suggest that, in case the industry is established, the roots should not be purchased by weight, as has been the custom in France, but according to their richness in sugar, after the German method. The former system has led the French beet-root growers to adopt the most lavish dressings of manure in order to swell the tonnage per acre, and they have succeeded, but only at a considerable sacrifice of the saccharine properties of the roots. Perhaps, too, as maize grows so freely in Quebec, the adoption of the rotation recently recommended to the French farmers, in the *Annales Agronomiques*, by Professor Dehérain, would be a step in the right direction.

*Injurious Insects.*—The annual loss which Canadian farmers sustain through the ravages of injurious insects is appalling. Mr. J. Fletcher, Vice-President of the Entomological Society of Ontario, says that, taking the average annual farm-produce of Canada at only 40,000,000*l.*, which is the lowest possible estimate, the lowest figure at which he can put the injury done by insects is one-tenth of the whole, or 4,000,000*l.*; he believes that the ravages of the wheat-midge, the Hessian fly, and particularly the clover-seed midge, are all preventible. Mr. W. H. Harrington, Ottawa, says it was in 1856 or 1857 that the wheat-midge—whose orange-coloured larvæ in the furrow of the young grain are well known to English farmers—first appeared in Canada, and the damage it did to the wheat-crop in Ontario in one of those years was estimated at 1,600,000*l.* It had previously, in 1854, been very destructive in the United States, where it was introduced from Europe about the beginning of the present century. Of late years the damage has been lessened in Canada by using midge-proof wheat. Certain varieties of wheat, producing an inferior grain, and a hard coat, were found not to be touched by the midge. These were hybridised with wheat yielding a good grain, and the result was a better quality of grain, retaining the hardness of coat which baffles the attacks of the midge. Similarly the Hessian fly has been dealt with by producing plants with heavier stalks. This pest feeds in the joint of the stalk above the root, and if the stalk is too hard for it, not much harm is done. Mr. L. Van Camp, of Bowmanville, Ontario, a farmer delegate from the Dominion Grange, says:—

“As for the insect scourge in agriculture, it places the agriculturist in a continual warfare from the time the frost leaves the soil in the spring until it

binds it up again in the fall. During all that time the agriculturist has no leisure. If he wishes to be prosperous he must only take sufficient time to eat his meals and sleep. At other times he must be carrying on a continual warfare with these insects. There is something to attack everything that the farm produces, and if we do not give attention to it the crop is sure to be a failure."

Here is work for a State Entomologist! And it is satisfactory to be able to add that last year a Dominion Entomologist was appointed by the Minister of Agriculture, the first occupant of the post being Mr. James Fletcher, whose name has already been mentioned. In his preliminary report, Mr. Fletcher states that he has commenced the collection of a representative exhibit of the injurious insects of Canada, together with the plants attacked by them, and the mode of attack, as well as the beneficial insects which keep the injurious kinds in check. During the present year the cutworms, clover-insects, insect parasites of cattle, and the larch saw-fly, which was first recorded as a Canadian insect in 1882, have been selected as special objects of study and investigation. Last year one of the joint-worms did great harm to the grass-crops of Western Ontario, and entirely destroyed some of the hay-crops in New Brunswick. The extent of the damage done by the clover-seed midge is sufficiently evidenced by the fact that, whereas a few years ago large quantities of Canadian clover-seed were exported to the United States, where there was a great demand for it, at the present time Canada has to import seed for home-growth. Last year the larva of the larch saw-fly, which is new to Canada, did so much mischief, that the tamaracs were, in many parts of New Brunswick, Quebec, and Ontario, almost completely deprived of their leaves.

*An Experimental Farm and Central Bureau of Agriculture.*—A very strong feeling prevails in favour of the establishment of an Experimental Farm, and of a Central Bureau of Agriculture. Though the Dominion Cabinet includes a Minister of Agriculture, the Department of Agriculture has to concern itself with several matters which have little or no connection with agriculture. That this is so may be inferred from a summary of the contents of the Minister's Annual Report to the Governor-General, which embraces the following sections:—I. General Remarks. II. Arts and Agriculture. III. Patents. IV. Copyrights, Trade Marks, &c. V. Quarantine. VI. Immigration. VII. Census and Statistics. VIII. Health Statistics. Mr. John Lowe, the able and experienced Secretary of the Dominion Department of Agriculture, states that the Act of 1868, constituting the Department of Agriculture, would amply provide for the establishment of a Bureau of Agriculture, and for the



appointment of a Commissioner of Agriculture. There has hitherto been no special vote for the general purposes of agriculture, although there have been special votes in particular cases, as for cattle quarantine and inspection, the collection of statistics in certain special cases, and grants to exhibitions; up to the present these have comprised the whole functions of the Department in relation to Agriculture.

As this subject is not without current interest at home, I may briefly refer to the work done by the United States Department of Agriculture at Washington. Originally embraced in the Patent Department, the United States Department of Agriculture was formally and permanently organised as a distinct department in 1860. Its work consists in (1) the dissemination of rare and valuable plants and seeds, which are procured both by purchase, and by exchange with foreign countries; (2) the communication to different districts of the information derived from other localities as to soils, methods of cultivation, climatic influences, &c.; and (3) the publication of results obtained in the principal subdivisions through their researches and experiments. Congress has been liberal in its grants to the Department, which, in the year ending 30th June, 1882, expended considerably over 70,000*l.*, the items including: purchase and distribution of valuable seeds, 16,000*l.*; experiments in tea-culture, 1750*l.*; experimental garden, 1400*l.*; investigating natural history of insects, 4000*l.*; investigating diseases of swine, 4489*l.*; reclamation of arid and waste lands, 2000*l.*; report on forestry, 1000*l.*; experiments in manufacture of sugar, 6466*l.* The fact that the work of the Department is constantly extending, and that the expenditure is growing annually, may be taken as evidence that the people of the United States believe their Department of Agriculture is worth its cost. Many products are now successfully and profitably grown that were introduced and first experimented on by the Department. Within the last few years experiments have been made at considerable expense with the sorghum sugar-cane, with the tea-plant, and for the encouragement of grape-culture and wine-making. Should these experiments prove successful, and lead to extensive and lucrative prosecution of the industries connected with the growth of these articles, the cost will be insignificant beside the results. By experiments such as these the United States Department of Agriculture has already conferred great benefits upon the people.

*Recommendations of the Select Committee on Agriculture.*—The following is the conclusion of the Select Committee's Report to the House of Commons:—

"Considering that the proper development of our agricultural resources is indispensable to the upbuilding and maintenance of our national wealth and



prosperity, and that all progressive countries are at present making strenuous efforts for the introduction of improved methods of agriculture, your Committee believe that no object is more deserving of the active and generous support of the Federal Government than that of fostering and promoting this great industry, and of prompting, guiding, and co-operating with all local and provincial institutions formed for the furtherance of this object. Your Committee, therefore, beg leave to submit the following recommendations:—

"That the Government take into earnest and favourable consideration the advisability of establishing a Bureau of Agriculture, and an Experimental Farm in connection therewith.

"That this Bureau be formed in connection with and under the supervision of the present Department of Agriculture.

"That the objects aimed at in the establishment of such Bureau and Farm be as follows:—

"1. To conduct such experiments in the introduction and culture of new varieties of seeds, plants, trees, &c., as will most efficiently aid in the advancement of Canadian agriculture; to institute experiments with regard to the comparative value of fertilisers, the proper testing of seeds as to vitality and purity, and the healthy preservation and productive conditions of plants and animals.

"2. To make careful investigation into the origin, distribution, and habits of insects injurious and beneficial, and the contagious and other diseases to which animals and plants are subject, in order to arrive at the best methods of destroying and counteracting them.

"3. To study the qualities of the various breeds of cattle and other domestic animals, with the view of reporting on the best means of improving them; of protecting them from parasites and epidemic diseases, of feeding them for the market, and on the treatment of milch cattle.

"4. To initiate and carry out a convenient and comprehensive system of gathering the latest and most useful information, statistical and otherwise.

"5. To publish and send to the press and the various agricultural and horticultural societies of the Dominion, at different periods of the year, bulletins giving the results of trials made on the Experimental Farm, and whatever other information the Bureau may consider useful, either in the prevention of the ravages of insects and of contagious diseases among animals, or concerning improved methods of culture that have stood test, or for the special advancement of any line of agricultural pursuits."

*Horse-breeding in Canada.*—From the Census Returns of 1881 it is inferred that the total annual value of agricultural produce in Canada may be estimated as follows:—

|                                     | £           |
|-------------------------------------|-------------|
| Horses .. .. .                      | 1,186,284   |
| Cattle, killed or sold only .. .. . | 3,288,405   |
| Sheep " " .. .. .                   | 1,496,465   |
| Swine " " .. .. .                   | 3,907,509   |
| Wool and Honey .. .. .              | 602,552     |
| Total Animal Produce .. .. .        | £10,481,215 |
| Dairy Produce .. .. .               | 4,288,502   |
| Hay .. .. .                         | 6,066,972   |
| Grains and Hay Seeds .. .. .        | 18,403,249  |
| Roots .. .. .                       | 4,518,968   |
| Grand Total .. .. .                 | £43,758,906 |

Horses make up more than one-tenth of the animal produce, and Mr. E. A. Barnard, Director of Agriculture, Quebec, has drawn attention to the neglect of horse-breeding in the Dominion. Considering the demand for good draught and driving horses both in Europe and in the United States, and the special facilities many parts of Canada—particularly Prince Edward Island, the present Arabia of the Dominion—possess for the raising of horses, the returns from this source should be largely increased. Moreover, the difficulty of procuring remounts for the cavalry and artillery regiments of the British army increases every year, and the authorities might with advantage turn their attention to the capacity for horse-raising which the Dominion possesses. Canada exports hay and coarse grains sufficient to enable her to raise for exportation ten times as many horses as leave her shores at present. The following figures are from the Trade and Navigation Returns, 1883:—

*Value of Exports of Hay and Coarse Grains from Canada, 1883.*

|                             | £          |
|-----------------------------|------------|
| Barley .. .. .              | 1,258,647  |
| Pens .. .. .                | 432,342    |
| Other Coarse Grains .. .. . | 310,837    |
|                             | <hr/>      |
|                             | £2,001,826 |

*Hay.*

|                                    | £          |
|------------------------------------|------------|
| 1881 .. .. .                       | 363,712    |
| 1882 .. .. .                       | 183,138    |
| 1883 .. .. .                       | 180,421    |
|                                    | <hr/>      |
| Total .. .. .                      | £727,271   |
| Hay—Average of three years .. .. . | 242,424    |
|                                    | <hr/>      |
| Total .. .. .                      | £2,244,250 |

It is reasonably suggested that, bearing in mind the continued efforts made by the European States to improve the raising of horses, all this coarse food might well be kept to increase the number of good horses—for nobody wants bad or poor horses—thus securing much higher profits, besides retaining a large quantity of valuable manure. A regular and official inspection of stallions has even been proposed, and Dr. McEachran has suggested the desirability of imposing a heavy tax on all stallions unfit for useful reproduction. I may here observe that the farm horses in Canada are, as a rule, much lighter than the horses to be seen on arable farms in England. When a visitor calls on a Canadian farmer it is no unusual thing to see a horse taken from the plough and put

into a dog-cart or light waggon, and start off at a good swinging pace round the farm.

*Agricultural Production in Canada.*—The following Table is given on Mr. Barnard's authority:—

*Lowest estimated value of Farm Stock in Canada.*

|                          | £           |
|--------------------------|-------------|
| Horses and Colts .. .. . | 11,906,284  |
| Working Oxen .. .. .     | 795,558     |
| Cows .. .. .             | 7,979,600   |
| Other Cattle .. .. .     | 5,359,788   |
| Sheep .. .. .            | 3,048,678   |
| Pigs .. .. .             | 2,173,714   |
|                          | <hr/>       |
|                          | £31,263,622 |

It is maintained that, by better selection, and by a more rational system of feeding in summer and in winter, the cash value of farm stock, and the returns therefrom, might be doubled in a few years.

How much the agricultural production of the Dominion might be increased by proper care is amply illustrated by the case of eggs. A Table in the first part of this paper shows the annual export of eggs from Canada to be valued at nearly half a million pounds sterling,—40 per cent. above the value of the export of horses, and 60 per cent. above that of sheep. Even the export of cattle, which has created so large a trade for the ocean steamships, does not produce more than 75 per cent. over that of eggs. This export of eggs, moreover, simply represents the surplus after all home demands have been liberally supplied.

On a rough estimate Canada can produce pure-bred cattle at about half the outlay to which the English farmers are put, and can finish off beef and mutton at about two-thirds the cost. This is due largely to cheaper crops, and to the admirable system of quarantine whereby freedom from fatality induced by disease is secured. It is beyond doubt that the Dominion can produce the best of cattle; and as the Canadian farmers launch out more extensively in the stock-raising business, so will they feel compelled to resort to suitable and approved rotations of crops made subsidiary to stock-raising, stock-fattening, and milk-production. The Maritime Provinces, so admirably adapted to the requirements of live-stock, must speedily show signs of this, particularly as wooden ship-building is on the decline.

Indeed, it is probably a safe statement to make, that wheat-growing in Canada is moving westward, and is destined to undergo a marked contraction in the Eastern Provinces, where,

as I have previously taken occasion to remark, the limits of the natural fertility of the soils have in many cases been passed. Even now, the average production of wheat, taken over all the wheat-lands of the Dominion, barely reaches 14 bushels per acre. How, in the Eastern Provinces, the yield of wheat has been steadily reduced, Professor Brown has aptly pointed out: "We did not stop at 16 bushels, because: (1) we could easily increase the productive area; (2) grain is less expensive to produce; (3) it is a lazy system of farming, and thus most acceptable to the many as against the few; and (4) the product has always been in demand." And the same arguments would hold for not stopping wheat-growing when the yield had dwindled to 14 bushels, to 12, or even 10. And, no doubt, this love for wheat-growing will go a long way to explain how it is that eastern farmers, particularly of Ontario, rather than embark extensively in stock-raising, stock-fattening, and the necessary rotation of crops based on English and Scotch methods, prefer to sell their old farms and go on to the western prairies, where they can buy virgin soil at one-quarter to one-tenth the cost per acre of what they realised on their eastern holdings, and thus embark again upon continuous wheat-growing. By such means they are, moreover, enabled to establish their sons on separate farms, which, in the majority of cases, they could not do on the higher-priced lands of the East. There must further be taken into account the restless pioneer spirit which still animates the breasts of probably most Canadian farmers; there is no feeling of sentiment awakened, no ancestral associations rudely broken, when the Canadian farmer gives up his eastern holding, and, impelled almost by a nomadic impulse, seeks fresh fields of labour in the direction of the setting sun.

As things are now, much of the Canadian soil has been run out by continuous grain-cropping, the acreage under cereals being out of all proportion to the requirements of good farming. Approximately, the proportionate acreage of crops in the Eastern Provinces is,—cereals, one-half; hay, one-fourth; pasture, one-eighth; roots, one-sixteenth; leguminous crops, one-sixteenth. Nevertheless, with a more rational system of farming, there would not be much difficulty in at least doubling the average yield of cereal crops per acre. According to the Census Returns of 1881, the total area of land in hoed crops of all kinds did not exceed 4 per cent. of the land under cultivation. And yet Indian corn, with its rapid and luxuriant growth, is an admirable crop for smothering weeds, and might well be employed in conjunction with roots for the cropped fallows. With abundant manure and extensive horse cultivation, and with a selection of seed suited to their northern climate,

Canadian farmers can grow from 75 to 100 bushels of corn per acre, at a cost not exceeding 2s. per bushel, to say nothing of the three or four tons of excellent fodder; as green food, Indian corn properly cultivated and fed in conjunction with other fodder, has been proved to be one of the cheapest and one of the best articles of diet for the production of meat or milk.

*Grass Lands.*—Turning for a moment to the consideration of grass lands, nothing is calculated to surprise an agricultural visitor to Canada more than the paucity of cultivated grasses. The Dominion farmers, indeed, cultivate but one grass, and that is timothy. A field of timothy, and nothing but timothy, was a novel sight to me at first, but I soon got used to it. So common is timothy, that it has long since escaped from the cultivated lands, and is a familiar weed-grass almost everywhere in Eastern Canada,—along road sides and railway tracks, and on waste lands in or near the towns. And the people evidently believe in timothy, pure and unmixed, for growers are as ready to give, as buyers are eager to demand, a guarantee that the “tame” hay they offer for sale is clean and pure timothy. Similarly, of the leguminous plants, only the common red clover seems to be generally cultivated. Foxtail, cocksfoot, the fescues, the meadow grasses, and the rye-grasses are almost unknown in cultivation; and the same may be said of Dutch clover, alsike, black medick, “trifolium,” and sainfoin. Catch crops, and “seeds” for two or three years’ lay, are quite outside the practice of the bulk of Canadian farmers. Still, in justice to the Ontario Experimental Farm, it must be stated that most of these green forage plants are being submitted to trial, and that the valuable results hitherto obtained have already attracted the notice of the more progressive farmers of the Province, some of whom are sowing mixtures of grass-seeds, and otherwise introducing the cultivation of a valuable group of plants which have too long been neglected. Very satisfactory results have attended the trials of lucerne, and there is no doubt that this crop might be grown with great advantage in most districts where the latter part of summer is usually droughty, as in such circumstances it would be an invaluable adjunct to failing pastures. Hungarian grass, a species of *Setaria*, one of the millet grasses, is, by the way, somewhat largely grown in certain districts, but I should think it would be well to replace it with mixtures of ascertained utility. The laying down of land to grass is a problem that will have to be grappled with before long in Eastern Canada, and, in the event of the proposed Central Bureau of Agriculture being established, it should certainly provide for an efficient seed control, otherwise incalculable mischief may arise from the scattering of impure and ill-chosen grass-seeds throughout the land.

Better care of the manure heap is imperatively necessary. Mr. Barnard says, "The liquid manure, which is worth more than the solid matter, is mostly all lost; then the solids are cave-washed, burned, or fire-fanged, before carting to the field, and there too often sun dried. As generally treated by nearly all farmers in Canada, manure goes to waste to a greater or less degree, but aggregating to 75 per cent., as I believe can be proved unquestionably. As long as this waste is allowed, but little interest can be given to the very important question of artificial fertilisers."

But signs of improvement are not wanting, particularly in Ontario, where drainage is now being much resorted to, better roads are being made, and straight fences are replacing the snake fences which occupy so much room and so freely harbour weeds in their innumerable angles. In this progressive Province, too, the cultivation of a larger number of species of grass, and the laying down of permanent pasture, must be included among the new departures. And, as already mentioned, rotations of crops are slowly finding their way into practice, while marked improvements are noticeable in the winter feeding of live-stock.

In Canadian farming, machinery is used to a much greater extent than is the case in England. This arises, of course, from the character of the seasons in Canada, for practically there are only two divisions of the year,—summer and winter. Such autumn as there may be is short, spring is shorter. Seed time, therefore, is a period of great pressure, and incessant labour; harvest is an equally busy time, so that much of the manual labour of our own country devolves upon machinery in Canada. The implement manufacturers are gradually concentrating their efforts on one or other of three branches,—the cultivating, the seeding, and the harvesting; and in Canada, as in the United States, each season brings with it some new design or improvement. This rapid extension of mechanical aids is gradually rendering superfluous much of the skill of the husbandman, as in the case of the sulky ploughs, which seat the driver, and cut one furrow. I may here mention a few of the prices. The Buford sulky plough, 12, 14, and 16-inch cut in steel bottoms, and furnished with rolling coulter, 11*l.* to 13*l.*; the Buford *gang* sulky plough, cutting *two* furrows, each 12 inches wide, made entirely of iron and steel, except the pole and whippletrees, and with rolling coulters, 20*l.*; ordinary ploughs, 3*l.* to 4*l.*; whipple spring harrow for preparing stiff, rough, or dirty land for seed, 7*l.* to 9*l.*, according to size; Monarch potato digger, 2*l.* 8*s.* Among the commonly seen implements are the Massey mowers, harvesters, and rakes; the Brantford two-horse

twine binders, wide-cut corn binders, front-cut and rear-cut mowers, and spring tooth harrows; and the Hoosier grain and fertiliser drills. Even the use of straw for fuel on the prairie has been provided for, as in the Abell straw-burning portable engine. The general excellence of Canadian agricultural machinery cannot fail to impress the observer.

I have alluded to the migratory habits of Canadian farmers, which undoubtedly constitute a hindrance to better farming. Another check arises out of the tempting and almost unlimited field for speculative land purchases by wealthy individuals and companies who are in a position to acquire large tracts of land to the exclusion of ordinary settlers. The men who are attracted to Canada are, as a rule, the reverse of wealthy; but, at the outset, a deficiency of ample means is probably a much less evil than a lack of agricultural knowledge. The easy and inexpensive sale and transfer of land is another element not to be left out of consideration; and as regards the ownership of the soil, I may again quote my colleague, Professor Sheldon, who, in addressing the Economic Section of the British Association, at Montreal, last August, said,—

"The Canadian farmer owns the land he farms, and can do with it what he likes. All very well, this, when ownership does not bury too large a capital; but in course of time, as land increases in value, a landlord and tenant system will grow up in Canada, and it would be well that it should at the outset be defined on equitable lines. The British farmer avoids the loss which comes of a fall in the value of land—a loss from which every agricultural landowner in Britain is suffering to-day, more or less—and his capital is all available for active operations. So long as the industry of farmers is duly shielded from injustice, it is a loss rather than a gain to them to be landowners, for landowning at 2½ per cent. is a luxury in which bread-winners can hardly afford to indulge."

The transfer of land in Canada is very easily and cheaply effected. In every district there is an office in which titles to land have to be registered. All mortgages or other charges made upon property have to be recorded in the same way as the titles, and are not valid unless this is done. A person, therefore, desiring to purchase land, can prove at a trifling cost the *bonâ fides* of the title that is offered, and can also ascertain what charges or encumbrances may be in existence. This, generally and strictly, is the system in operation throughout the Dominion. The matter is one that is dealt with by the local governments, and the details may, therefore, to some extent differ in the various Provinces. The general desire, however, is to simplify as much as possible such transfers, and to get them effected cheaply. It is not unlikely that the present arrangements may be amended by the adoption of the Torrens system, now in force in Australia, which is an amplification of that in use in Canada.



## CANADIAN FORESTRY.

Though occasional references have been made to the forests of different parts of the Dominion, the subject is of such great importance, both present and prospective, as to call for a brief separate notice. Dr. Robert Bell, whose knowledge of the Canadian forests extends over a quarter of a century, arranges the trees found east of the Rocky Mountains in four geographical divisions:—

1. A northern group, including the white and black spruces, larch, Banksian pine, balsam fir, aspen, balsam poplar, canoe birch, willows, and alder. These cover the vast territory down to the line of the white pine.

2. A central group of about forty species, occupying the belt of country from the white pine line to that of the button-wood.

3. A southern group, embracing the button-wood, black walnut, the hickories, chestnut, tulip-tree, prickly ash, sour gum, sassafras, and flowering dog-wood, which are found only in a small area in the southern part of Ontario.

4. A western group, consisting of the ash-leaved maple, bur-oak, cotton wood, and green ash, which are scattered sparingly over the prairie and wooded regions west of Red River and Lake Winnipeg.

Mr. A. T. Drummond, who has made a special study of Canadian forestry, says:—

"Canada may be divided into four great forest areas or zones, which may for convenience be termed the zones of the (1) Douglas fir, occupying central and southern British Columbia; (2) poplars, covering the whole country from the most northern limit of the growth of trees southward, east of the Rocky Mountains, to the south Saskatchewan, Qu'Appelle, and Winnipeg Rivers, Lake Nepigon, and Anticosti, in the Gulf of St. Lawrence; (3) white and red pine, extending from the Lake of the Woods and Lake Nepigon, to Anticosti; thence to the Georgian Bay, Lower Ottawa River, and Nova Scotia; (4) beech and maple, occupying those parts of Ontario and Quebec lying south of the zone of the pines. Along the shores of Lake Erie is what might almost be regarded as a fifth zone, very circumscribed in area, but having within it several outliers of the forests of the Middle States."

Of the 340 species of forest trees of North America only 95 are to be found in Canada, and of these only three are identical with European species, namely, the chestnut, white birch, and yew. With regard to the future supplies of timber which may be available in Canada, Dr. Bell finds that the greater part of

the white oak and rock elm have been already exported, while the cherry, black walnut, red cedar, and hickory have likewise been practically exhausted. Red oak, basswood, white ash, red cedar, hemlock, butternut, and hard maple, as well as many inferior woods, are still to be found in sufficient quantity for home consumption. A considerable supply of yellow birch still exists, and in some regions it is as yet almost untouched. The white pine, the great Canadian timber tree, has a more limited range than is generally supposed, and the principal reserves are in the region around Lake Temiscaming, and thence westward to the eastern shores of Lake Superior. When the exportable white and red pine have become exhausted, as must happen before many years, there are still vast quantities of spruce and larch, which may even now be regarded as the principal timber available for this purpose in the future. Tremendous havoc has been wrought by forest fires, and it is estimated that the quantity of red and white pine destroyed in this way in the Ottawa Valley and in the St. Maurice and Georgian Bay regions is many times greater than all that has been felled by the axe. Yet even this is insignificant compared with the quantity of pine, spruce, cedar, larch, balsam, and other trees which have been destroyed by fire in the more northern latitudes all the way from the Gulf of St. Lawrence to the Nelson River, and thence northwestward. The northern coniferous forests are more liable than others to be destroyed by fire. In the summer season, when the gummy tops of the trees and the mossy ground are alike dry, they burn with almost explosive rapidity. Small trees are thickly mingled with the larger ones, so that their branches touch each other, and thus form a sufficiently dense fuel to support a continuous sheet of flame on a grand scale. Before a high wind the fire sweeps on with a roaring noise, and at a rate which prevents the birds and beasts from escaping. After a time, shrubs and bushes spring up on the burnt area, then aspens and white birches, among which the cone-bearing trees begin to appear, and after a century and a half or more these will have regained possession. This alternation of crops of timber appears to have been going on for many centuries, but in modern times the fires have been more numerous than formerly. Occasionally due to lightning, these fires are mostly traceable to the carelessness of white men and demoralised Indians. The fires are not so liable to run in forests of full grown white and red pines, and hard wood forests are seldom burnt to any great extent. In several localities I noticed the weird sight presented by the charred and branchless trunks as they were left, dead and silent, after the fury of the fire had swept over them.

A Parliamentary Blue-book \* contains the most recent official information on the forests of the several Provinces of the Dominion. In Prince Edward Island there are now no forests of any extent, they having all disappeared under the axes of the settler and the lumberman. In Nova Scotia, all or nearly all the timber lands will have been cut over for the first time by or perhaps before the year 1890. By careful husbanding, a second cut nearly equal to the first can in many localities be obtained after fifteen or twenty years, so that, if it were not for the forest fires, those lands which are well looked after would never become denuded of their timber. As it is, the supply of pine and spruce is rapidly approaching exhaustion, and the lumbering trade is on the decline. Large areas once covered with a stately growth of pine, spruce, and other trees, have been rendered almost barren by fires. No discretion is exercised, nor is any protection extended to the forests in Nova Scotia; every man may cut as he pleases.

The Province of Ontario contains 18,000 square miles of land, known as timber limits, that is, land on which lumbermen have purchased the right to cut lumber for a certain period, renewable yearly, and on which lumber, when cut, they also pay certain dues to Government in proportion to its amount. No data exist upon which to base an estimate as to how long it will take, at the present rate of consumption, to exhaust the timber of these lands. The Government lands, on which no licence to cut has yet been granted, are believed to contain about 20,000 square miles of forest, possessing much valuable and merchantable timber. Mr. P. White, M.P. for Renfrew, Ontario, estimates the value of the timber annually destroyed by forest fires in the Ottawa District at four million pounds sterling. Mr. Stewart Thayne, of Ottawa, a recognised authority on forestry, submitted to the Select Committee on Agriculture the following suggestions as to the duty of the Canadian Government:—

"The principal point upon which they might take action would be this: they should separate the lands which are known to be unprofitable for agriculture, and devote them exclusively to forestry purposes, or to the production of timber. We have lands of that character here. Up the Ottawa, for instance, settlers have been induced to go in and settle on the pine lands. There, after one or two crops, it will take more than the original value of the lands to make them produce again. After three or four crops, at the outside, the thin covering of the soil over the sand becomes utterly exhausted. These pine lands, and all the lands only fitted for the cultivation of pine and spruce, should be set apart for the cultivation of those trees. There are millions

\* 'Reports on the Forests of Canada. With Précis by Dr. Lyons, M.P., of certain papers submitted therewith.' London: Printed by Eyre and Spottiswoode, 1885.

and millions of acres in Ontario and Quebec which could be made productive timber districts, but which will never be productive agricultural districts."

In the Province of Quebec, the Laurentian Forest Highlands, lying on the north of the St. Lawrence, occupy an area of 178,000 square miles, the greater portion of which, being fit for nothing else, must remain a timber-forest for ever, increasing in value as timber becomes more scarce elsewhere. It is capable of maintaining a sparse but hardy population in comparative comfort by the development of the resources of its mines, and of its forests, if cared for and preserved. Another forest-region in the Upper Ottawa territory covers an area of some 30,000 square miles. On account of its favourable geographical position along the banks of a great river, and the unfitness of much of its area for other cultivation, the Province of Quebec seems destined to remain a timber-yielding and timber-trading country. A Committee appointed by the American Forestry Congress, at its Montreal Meeting, recommended :—

1. The reservation of all pine and spruce lands, unfit for settlement, for lumbering purposes exclusively.
2. The prohibition of the burning of bush by settlers in the vicinity of fir trees during the months of May, June, September and October (burning in July and August being already interdicted in the Province of Quebec).
3. The division of the timber country into districts, and the appointment of police under a superintendent with magisterial powers, whose duty it shall be to detect and punish offenders, and provide for the extinguishment of fires.
4. The cost of the maintenance of this protection might partially be met by the imposition of a moderate tax on the parties owning or leasing timber lands.

In British Columbia, the southern and western portion is a densely wooded country, both mountains and plains being covered with thick and stately forests. To the north and east there is less timber, and that of inferior quality. The forests of economic value embrace an area situated between the Cascade range of mountains and the Pacific coast, and extending from lat. 49° N. to lat. 55° N., together with Vancouver and adjacent islands, and the Queen Charlotte group. The valuable Douglas pine, or red fir, covers that portion of the area indicated which extends between the southern boundary and a parallel drawn through the north extremity of Vancouver's Island. North of this northern line, and including the Queen Charlotte Islands, the Douglas fir is largely replaced by yellow cypress, red and white cedar, and white pine. The numerous and far-reaching inlets along the sea-board afford access to the forests, and greatly facilitate lumbering. The interior of British Columbia is but sparsely timbered, but the eastern portion, watered by the Columbia and Kootenay rivers and their tributaries, contains large areas of timber of great commercial value.

In New Brunswick there are 9000 square miles of forest area not under license, and 3500 miles under license.

The area of timber lands in the Dominion is estimated to cover in all about 280,000 square miles. In the United States, the timber lands yet remaining in possession of the Government occupy 132,000 square miles, representing, at the present rate of consumption, about 28 years' supply. The Hon. Geo. B. Loring, for many years Commissioner of Agriculture in the United States, is of opinion that in the course of one generation the forests of the United States will be almost entirely exhausted: in this case an active demand for Canadian timber is sure to spring up in the American market; so that unless the conservation of the forests of Canada is efficiently provided for by the Dominion authorities, this will be likely to constitute one more link in the chain of causes that are operating against the preservation of the forests of British North America. But the people of Canada appear now to be fully alive to the necessity of providing by legislative enactments against any further careless or reckless dealing with what should be one of the most permanent and valuable sources of revenue to the Dominion. Measures will probably be introduced providing for the setting aside of large districts for forest purposes, and for the regular maintenance of officials charged with the duty of preventing the occurrence of forest fires. At present, the Province of Quebec appears to take the lead in arboricultural legislation. The "arbour days," or tree-planting holidays of Quebec and New Brunswick, are deserving of speedy imitation in the other Provinces of the Dominion.

Canada is undoubtedly in need of one or more good schools of forestry, such as those which exist in France or Finland; and technical schools of this character should be established by the Government with as little delay as possible. It is well known that men who are selected by the Civil Service Examiners to enter the Woods and Forests Service of India, are required to spend a year or two in France, at the Forest School of Nancy, or at some similar institution, there to acquire that instruction in silviculture which their own country is unable to afford them. During several recent sessions, Sir John Lubbock, M.P., has brought under the notice of the House of Commons the utterly inadequate means this country possesses for the teaching of forestry, and last session obtained considerable support in his advocacy of the establishment of a forest school. In opposition to this proposal, it was urged that there are within the limits of the United Kingdom no woodlands of sufficient size to meet the requirements of such a school; but whether this be so or not, the objection is such as cannot possibly apply to Canada. The

conservation of the forests of the Dominion is a subject as much of imperial as of colonial interest, and it seems to me that the establishment of a thoroughly equipped forest school in Canada, the cost or part of the cost of which might be jointly borne by the Dominion and the Imperial Governments, would not only produce a number of well-trained foresters, under whose care the timber supply of the Dominion would be efficiently fostered, but would afford admirable means for training British foresters for service in distant parts of the empire. To acquire such technical training it would not then be necessary to repair to a foreign country, the instruction would be given in what is still the greatest forest region in the world, the school could be reached in less than a fortnight from any part of the United Kingdom, and cheap ocean fares and inexpensive living in the Canadian forest school would add to the attractiveness of such an institution.

Canada is so near to us that for some years past she has been represented at the Annual Meetings of the Royal Agricultural Society, where the Canadian exhibit is always a pleasing and instructive feature. The Dominion exhibit, under the care of Mr. John Dyke, of Liverpool, and Mr. Thomas Grahame, of Glasgow, comprises produce from all parts of Canada, and no doubt some readers will remember the monster Canadian cheese at Kilburn. The other exhibit, that of the Canadian Pacific Railway, is under the superintendence of Mr. Alexander Begg, and is concerned more particularly with the produce of the prairie. These exhibits are always worth inspection; but a far better way of becoming acquainted with the Dominion is to pay it a visit, a journey to Canada in the summer having now become an easy, pleasurable, and instructive trip, the ocean passage from Liverpool to Quebec not occupying more than eight or nine days. During the last two summers a considerable number of agriculturists, most of them combining business with pleasure, have visited the Dominion, and by means such as these the resources of Canada are bound to become better known and understood among us, and it is well that this should be so. It is perhaps worth mentioning here that on my return voyage in the Allan mail steamer, "Parisian," an impromptu meeting was convened in the saloon one afternoon, under the chairmanship of Lord George Hamilton, M.P., to discuss the question, "Is Canada a suitable field for emigration?" and the expression of opinion, which included that of General Sir J. H. Lefroy, R.A., F.R.S., whose knowledge of the Dominion extends back for nearly half a century, was almost unanimously in the affirmative.

I desire here to acknowledge my obligations and to express my



thanks to Mr. Joseph G. Colmer, Secretary of the Office of the High Commissioner for Canada, who has always most courteously aided me at all times when I have sought the benefit of his advice and experience.

#### CONCLUSION.

In seeking to arrive at some general conclusions respecting the present character and probable development of Canadian agriculture, it is necessary to bear in mind the fact that it is only within the last forty or fifty years that any agricultural progress worthy of the name has been effected in Canada. Still more important is it to remember that the work of clearing the forest lands, opening up the country, and bringing the soil under cultivation, was originally performed by men who had little else than their muscles and their native courage to rely upon,—by hardy pioneers with little or no capital, who left their native shores with the brave determination to hew out from “the forest primeval” the means whereby they might acquire wealth and independence. It is perhaps regrettable that the extension of agriculture in the Dominion should be inseparable from the destruction of its forests: this was, of course, to a certain extent inevitable, but I have endeavoured to show that under a proper system of conservancy much of the existing forest areas may be preserved as sources of revenue for ever. The establishment of such forest conservancy should be no longer delayed. Many of the pioneers, to whom I have just referred, have advanced to leading positions in the administration of the affairs of the Dominion, and it is only in accordance with natural law that their sons should be worthy successors of such sires.

The increase of population has, owing to immigration, been much more rapid in Canada than is generally supposed, and, in this connection, the Dominion compares favourably with the great English-speaking nation which has effected so remarkable a development of the southern half of the North American Continent. Thus, in 1776, the United States contained about 3,900,000 inhabitants, and in 1881 about 50,000,000, showing an increase of some 1200 per cent. Canada, at the census of 1784, did not muster 150,000 people, whereas in 1881 the number had advanced to 4,324,810, an addition of nearly 3000 per cent. Moreover, since 1830, when both countries began to experience the effects of the tide of immigration from Europe, Canada has shown an increase of about 480 per cent., while that of the United States has been about 390 per cent. In other words, Canada has in the space of the last half century



increased her population five-fold, and the United States in the same period four-fold.

There are three points of contact between Canadian and British agriculture, which, in their commercial importance, are probably far superior to all others. These are represented respectively by the grain trade, the cattle trade, and the trade in dairy produce, or, to be more exact, the cheese trade. It is so elementary a fact that our own country is quite incapable of growing sufficient wheat for home consumption, that it is quite axiomatic to add that the additional supply must be derived from beyond the seas. A few years ago it seemed a safe statement to make that Canada would constitute the future granary of the mother country. The United States then appeared to be the most formidable rival of the Dominion, but the rapidly increasing demands of her own population have led to a remarkable falling off in the exports of wheat from that country to the United Kingdom during the last two years. America's need, however, has not proved to be Canada's opportunity, for another rival in a distant quarter of the globe has put in strong claims to be considered a controlling factor in the English wheat market, and, from a national or imperial point of view at any rate, the wheat-exporting power of British India constitutes a development of the resources of the Empire which it is pleasant to contemplate. As illustrating the point under notice, the following figures may prove of interest:—

IMPORTS of WHEAT into the UNITED KINGDOM from the UNITED STATES, BRITISH NORTH AMERICA, and BRITISH INDIA, and the TOTAL IMPORTS of WHEAT from all Sources, from 1874 to 1884.

|      | United States. | British North America. | British India. | From all Sources. |
|------|----------------|------------------------|----------------|-------------------|
|      | Cwts.          | Cwts.                  | Cwts.          | Cwts.             |
| 1874 | 23,048,552     | 3,807,174              | 1,076,876      | 41,479,460        |
| 1875 | 23,463,910     | 3,604,610              | 1,334,943      | 51,786,393        |
| 1876 | 19,209,785     | 2,417,151              | 3,279,887      | 44,394,152        |
| 1877 | 21,308,667     | 2,912,178              | 6,104,910      | 54,162,888        |
| 1878 | 28,963,901     | 2,603,586              | 1,819,304      | 49,811,643        |
| 1879 | 35,976,805     | 4,676,686              | 887,256        | 59,368,140        |
| 1880 | 36,089,869     | 3,893,514              | 3,247,242      | 55,197,304        |
| 1881 | 36,038,074     | 2,869,854              | 7,308,842      | 57,012,669        |
| 1882 | 35,059,623     | 2,684,828              | 8,477,479      | 64,171,622        |
| 1883 | 26,065,832     | 1,798,056              | 11,243,497     | 64,080,444        |
| 1884 | 22,606,130     | 1,757,406              | 8,009,909      | 47,113,998        |

Thus, while the United States sent us an almost uniform quantity of wheat during the four years 1879-1882, she sent us nearly one-third less in 1883, and less again in 1884. The

import of wheat from Canada has been steadily falling off since 1879, while since the same year the import from British India has been rapidly increasing; for though the total quantity derived from India in 1884 was three million cwts. less than in the preceding year, yet the ratio to the total imports of wheat from all sources was in the two years practically identical; but this reservation applies, of course, with equal force to the United States and Canada, for it will be seen that the aggregate import of wheat from all sources into the United Kingdom in 1884 was less than in any of the preceding seven years. If, as is not unlikely, the home demands of the United States lead to still further restriction in the quantity of wheat she may have for exportation, the result may be not only a diminution in the power of the most formidable rival Canada has to meet in the English wheat market; but it is even possible, as statements made in the first part of this paper seem to suggest, that at some perhaps not far distant time, the United States herself may become a wheat-importing country, and Canada would be in the best position to meet such a demand. It is evident enough that in the Dominion the cultivation of wheat on an extensive scale is moving westward; the low average yield of, for example, the Province of Quebec—9 to 10 bushels per acre—cannot fail to be discouraging in the face of recent low quotations. To what extent the wheat-growing capacity of Manitoba and the great North-west will be put to the test depends very largely upon the prospective market which the prairie-grown wheat is likely to command; but I have already given my reasons why mixed farming rather than mere wheat-raising will probably prove to be the safer course for the prairie farmer to pursue. The variety of Red Fyfe Wheat, known as No. 1 Hard, which grows to such perfection on the soils of the Red River Valley and of more distant parts of the prairie, seems likely, on account of its excellent milling properties, which increase in favour as they become better known, to meet with an increasing demand; and as wheat of this quality cannot be raised in the more southern latitudes beyond the international boundary, the farmers of the Canadian prairies are in possession of a monopoly which is likely to remain undisturbed.

The rapid growth of the Canadian cattle-trade is remarkable, and though it has had the effect of cheapening meat in the English market, it must nevertheless be remembered, that breeders at home have been distinctly benefited by the steady demand for pedigree stock of all kinds; and this is a demand which is likely to continue. How potent and beneficent has been the influence of pedigree-stock taken out from Britain by Canadian breeders is sufficiently shown by the fact that the

average value per head of horned cattle exported from Canada increased from 5*l.* in 1874, to 13*l.* in 1884, though, of course, the reduction in the cost of transportation, and the better and more rapid methods of transit, have not been without their influence in this direction. The following Table shows the total exports of cattle and sheep from Canada in the years 1874 and 1884 respectively :—

|                                    | CATTLE. |           | SHEEP.  |         |
|------------------------------------|---------|-----------|---------|---------|
|                                    | Number  | Value.    | Number. | Value.  |
|                                    |         | £         |         | £       |
| 1884 .. .. .                       | 90,664  | 1,182,578 | 304,474 | 309,230 |
| 1874 .. .. .                       | 39,623  | 190,254   | 252,081 | 140,513 |
| Increase during the decade .. .. . | 51,041  | 992,324   | 52,393  | 168,717 |

This great trade in living animals has only been rendered possible by the clean bill of health which the Dominion enjoys ; and I have shown what scrupulous care is taken to preserve this precious privilege.

As regards the dairy industry, the present position of the Canadian cheese trade can hardly be regarded as other than highly creditable to the Dominion, demonstrating, as it does, how successful cheese-makers have become in their efforts to produce a superior article of uniform quality. It is just the reverse with the butter-making industry ; but it must be apparent, from what has been stated under this head, that Canadian dairy-farmers are fully aware of their inferiority as butter-makers, and that measures which are now in progress will doubtless, in a few years' time, effect a needed and salutary change in the quality, and consequently in the quantity, of Canadian butter available for export. The following figures present a picture of the fluctuations in the trade in Canadian dairy produce during the last decade :—

#### TOTAL EXPORTS OF CHEESE AND BUTTER FROM CANADA.

|             | CHEESE.    |           |          | BUTTER.    |         |
|-------------|------------|-----------|----------|------------|---------|
|             | Lbs.       | Value.    |          | Lbs.       | Value.  |
|             |            | £         |          |            | £       |
| 1884 .. ..  | 75,835,557 | 1,564,724 | 1884 ..  | 8,473,976  | 334,953 |
| 1874 .. ..  | 24,050,982 | 704,640   | 1874 ..  | 12,233,046 | 524,061 |
| Increase .. | 51,784,575 | 860,084   | Decrease | 3,759,070  | 189,168 |

Thus, while the value of the exports of cheese has more than doubled during the decade, the value of the butter export has fallen off nearly 40 per cent. in the same period.

Hitherto, agriculture has been the main industry of Canada, and, in so young a country, it will probably for some time remain so. The great lumbering trade of the older provinces is less than it was, and the decline in wooden ship-building must make itself felt in New Brunswick and Nova Scotia. The magnificent facilities for transport the Dominion possesses in its splendid rivers and lakes, have no doubt greatly accelerated the removal of the forests; but these facilities, supplemented by such great arteries of railway communication as are afforded by the Grand Trunk, Intercolonial, and Canadian Pacific systems, have resulted in placing the Canadian farmer, even though his dwelling may be on the distant prairie, in close contact with the great markets of the world. Indeed it is not too much to say that, but for the opening up of the great North-West by the Canadian Pacific Railway, the colonisation and development of the prairies of British North America must have been indefinitely postponed. Even now, more railways are needed out west, to tap the resources of the fertile valley of the great Saskatchewan, and to put Winnipeg in communication with the southern coast of Hudson's Bay. The western prairies of the United States have been accessible since 1840, while those of Canada were first reached by railway only about five years ago.

The pioneers in Canadian agriculture were, in most cases, men who possessed but little knowledge of farming, and their number has been steadily increased by the accession of others whose knowledge was similarly defective; and it is but fair, in passing judgment upon the present condition of farming in the Dominion, to bear this fact in mind. That some generally applicable system of instruction in the theory and practice of modern agriculture would exert a powerful influence for the better is beyond doubt. That the Canadian farmers recognise the weakness of their position in this respect is sufficiently evidenced by the tone of the replies obtained by the Select Committee on Agriculture, the majority of which were in favour of the establishment of a Central Bureau, of an Agricultural Experimental Farm, and of a department devoted to Agricultural Statistics, besides advocating the circulation of handbooks and reports, and the issue of crop bulletins. It is much to be hoped that before long these suggestions will be realised, and that the Central Bureau will be supplemented by a local one in each Province. The Canadian Government, however, has not been unmindful of the agricultural interests of the Dominion; and in a young, and therefore a poor, country it has, by subsi-

dising the local agricultural societies, made it possible to stimulate enterprise and excite emulation among the farmers by the offer of prizes at the agricultural exhibitions. The value of these competitive shows is well illustrated in the marked and rapid improvement of the live-stock of the Dominion, and in the production of the Red Fyfe variety of wheat.

As the United States become more densely peopled, Canada will probably find there an outlet for some of her agricultural produce. She will spare no effort to maintain the position she has won for herself in the trans-oceanic cattle trade, while she will endeavour to supply in the wheat-trade the short-comings of the United States, whose export to this country is so visibly declining,—her great competitor in this field will be British India. With a superior article of butter, such as she is well capable of producing, she is advantageously placed for challenging the Danish trade with the West Indies, whither Denmark sends large exports of butter in hermetically sealed tins.

Nothing, I think, would have so salutary an effect on the agricultural practice of the Dominion as an influx of settlers of good farming experience. And what Canada most needs for the development of her great resources is increased capital, which would serve not only to extend her agricultural operations, but would assist in the development of her mineral wealth, and in the establishment of manufactories.

Canada is the nearest British colony. There is probably not a large town, certainly not a county, in the old country which has not supplied its quota, small or large, to the present population of the Dominion. The feeling of kinship on the one hand, and the growth in commercial relations on the other, are continually helping to bind the two countries closer together. To the agriculturist and the capitalist, to the political economist and the philanthropist, Canada, with her past so brief, and her future so pregnant with promise, presents a problem which for interest has never been surpassed. The greatest prejudice the Dominion has to live down is that connected with its climate, and all the unpleasant forebodings which were once uttered with respect to the older Provinces are now lightly transferred to the prairie. But, just as the Eastern Provinces are filling up with a healthy population, so I cannot help believing will be the case with the new lands farther west. I will even go a step farther, and submit that the offspring of the British people who are born and bred under the clear northern sky of the Canadian Dominion, with its undoubtedly severe climate, will in the course of generations develop into a finer, hardier, healthier race than descendants of the same people can hope to become in the lower latitudes of the same continent.

Natural history repeats itself as well as political history, and men are very much what their physical environment makes them.

I have endeavoured to present a picture of the Canadian Agriculture of to-day. At some future time another pen than mine will perhaps write its history again, and the progress recorded will probably be great. If I have erred in the discharge of my task, I believe the severest critic will hardly assert it to have been in the employment of colours of too brilliant a hue. But I am free to confess that I have sometimes had to repress an enthusiasm—pardonable I hope—born of my admiration of the persevering struggles of the men of our own race, and language, and aspirations, who, in the land of the beaver and the buffalo, have founded a civilization and established a great agricultural colony; whose people are imbued with an ardent and unselfish loyalty to the country whence they sprang, the spirit of which is reciprocated on this side of the Atlantic, and will, I hope, constitute for ever a bond of union between the mother country and the noble heritage which belongs to her sons and daughters in the Western Hemisphere. The completion of the Canadian Pacific Railway, which unites with a steel band the Atlantic and Pacific coasts of the Dominion of Canada, inaugurates a new era of peaceful conquest. As the years roll on, the pioneers of an improving and progressive Agriculture will move in increasing numbers in the direction of the setting sun, and establish new monuments of British industry and British enterprise on those lonely and distant prairies in the North West where, as yet,

“Grasses that never knew a scythe  
Wave all the summer long.”

